

1. Introduction

This package¹ currently supports generation of PDF/X-, PDF/A- and PDF/E-compliant documents, using pdfTeX, in most of their variants; see the complete list in Section 2.1 below. As of TeX Live 2016 it now also works with LuaTeX and XeTeX, when using appropriate command-line options², but with some limitations — see Sections 3.1.1 and 3.1.2. By ‘supports’, we mean that the package provides correct and sufficient means to declare that a document conforms with a stated PDF variant (PDF/X, PDF/A, PDF/E, PDF/VT, PDF/UA, etc.) along with the version and/or level of conformance. This package also allows appropriate Metadata and Color Profile to be specified, according to the requirements of the PDF variant.

Metadata elements, most of which must ultimately be written as XML using the UTF-8 encoding, is provided via a file named `\jobname.xmpdata`, for the running TeX job. Without such a file, providing some required information as well as a large range of optional data, a fully validating PDF file cannot be achieved. The PDF can be created, having the correct visual appearance on all pages, but it will not pass validation checks. Sections 2.2 and 4.1 describe how this file should be constructed.

What this package *does not do* is to check for all the details of document structure and type of content that may be required (or restricted) within a PDF variant. For example, PDF/VT [14] requires well-structured parts, using Form XObject sections tagged as ‘/DPart’. Similarly PDF/A-1a (and 2a and 3a) [16, 17, 18] require a fully ‘Tagged PDF’, including a detailed structure tagging which envelops the complete contents of the document, as does also PDF/UA [24]. This is beyond the current version of TeX engines, as commonly shipped. So while this package provides enough to meet the declaration, metadata and font-handling aspects for these PDF/A variants, it is not sufficient to produce fully conforming PDFs. However, with extra pdfTeX-based software or macro coding that is capable of producing ‘Tagged PDF’, this package can be used as part of the overall workflow to produce fully conforming documents.

1.1. PDF standards

PDF/X and PDF/A are umbrella terms used to denote several ISO standards [8, 9, 10, 12, 13, 16, 17, 18] that define different subsets of the PDF standard [1, 20]. The objective of PDF/X is to facilitate graphics exchange between document creator and printer and therefore, has all requirements related to printing. For instance, in PDF/X, all fonts need to be embedded and all images need to be CMYK or spot colors. PDF/X-2 and PDF/X-3 accept calibrated RGB and CIELAB colors along with all other specifications of PDF/X. Since 2005 other variants of PDF/X have emerged, as extra effects (such as layering and transparency) have been supported within the PDF standard itself. The full range of versions and conformance supported in this package is discussed below in Section 2.1.

PDF/A defines a profile for archiving PDF documents, which ensures the documents can be reproduced in the exact same way in years to come. A key element to achieving this is that PDF/A documents are 100% self-contained. All the information needed to display the document in the same manner every time is embedded in the file. A PDF/A document is not permitted to be reliant on information from external sources. Other restrictions include avoidance of audio/video content, JavaScript and encryption. Mandatory inclusion of fonts, color profile and standards-based metadata are absolutely essential for PDF/A. Later versions allow for use of image compression and file attachments.

PDF/E is an ISO standard [19] intended for documents used in engineering workflows. PDF/VT [14] allows for high-volume customised form printing, such as utility bills. PDF/UA

¹An earlier version of this documentation was published as [27]. All the changes since then have been developed and coded by the 3rd-listed author.

²The required invocation is: `xelatex --shell-escape -output-driver="xdvipdfmx -z 0" <filename>.tex`

(‘Universal Accessibility’) has emerged as a standard [24, 3, 4] supporting Assistive Technologies, incorporating web-accessibility guidelines (WCAG) for electronic documents. In future, PDF/H may emerge for health records and medical-related documents. Other applications can be envisaged. Declarations and Metadata are supported for the first three of these. The others are the subject of further work; revised versions of this package can be expected in later years.

More complete descriptions of these standards and their usage can be found on Wikipedia pages [29]. These pages also include comprehensive links to web resources, guides, commentaries, discussions and whatever else is relevant to how the standards have been established and how they can be used.

2. Usage

The package can be loaded with the command:

```
\usepackage[<option>]{pdfx}
```

where the options are as follows.

2.1. Package options

2.1.1. PDF/A options

PDF/A is an ISO standard [16, 17, 18] intended for long-term archiving of electronic documents. It therefore emphasizes self-containedness and reproducibility, as well as machine-readable metadata. The PDF/A standard has three conformance levels ‘a’, ‘b’, and ‘u’. Level ‘a’ is the strictest, but is not yet fully implemented by the pdfx package. Conformance level ‘u’ has the same requirements as level ‘b’, but with the additional requirement that all text in the document must have a Unicode mapping. However, the pdfx package produces such Unicode mappings even in level ‘b’ files. The standard also has three different versions 1, 2, and 3, which were standardized in 2005, 2011 and 2012, respectively. Earlier versions contain a subset of the features of later versions, so for maximum portability, it is preferable to use a lower-numbered version, when the extra features allowed in higher versions are not used. There is no conformance level ‘u’ in version 1 of the standard. Thus for many typical uses of PDF/A, it is sufficient to use PDF/A-1b.

- a-1a: generate PDF/A-1a. Experimental, not fully implemented.
- a-1b: generate PDF/A-1b.
- a-2a: generate PDF/A-2a. Experimental, not fully implemented.
- a-2b: generate PDF/A-2b.
- a-2u: generate PDF/A-2u.
- a-3a: generate PDF/A-3a. Experimental, not fully implemented.
- a-3b: generate PDF/A-3b.
- a-3u: generate PDF/A-3u.

By ‘Experimental, not fully implemented’ here we mean primarily that the document structure, as required for ‘Tagged PDF’, is not handled by this package. Using other pdfT_EX-based software that is capable of producing such complete tagging, conforming documents can indeed be produced.

2.1.2. PDF/E options

PDF/E is an ISO standard [19] intended for documents used in engineering workflows. There is only one version of the PDF/E standard so far, and it is called PDF/E-1.

- e-1: generate PDF/E-1.
- e: same as e-1.

2.1.3. PDF/UA options

PDF/UA is an ISO and ANSI standard [24, 4] intended for making structured documents readable and navigable using Assistive Technology; e.g., screen-readers, Braille keyboards and such-like. Documents prepared this way can be easily saved in other formats which preserve the structure, such as XML, HTML, and (Microsoft) Word-based formats.

- ua-1: generate PDF/UA-1.
- ua: same as ua-1.

2.1.4. PDF/VT options

PDF/VT is an ISO standard intended as an exchange format for variable and transactional printing, and is an extension of the PDF/X-4 standard. The standard specifies three PDF/VT conformance levels. Level 1 is for single-file exchange, level 2 is for multi-file exchange, and level 2s is for streamed delivery. Currently, none of the PDF/VT conformance levels are fully implemented by the pdfx package.

- vt-1: generate PDF/VT-1, based on PDF/X-4. Experimental, not fully implemented
- vt-2: generate PDF/VT-2, based on PDF/X-5pg. Experimental, not fully implemented.
- vt-2s: generate PDF/VT-2s. Experimental, not fully implemented.

By ‘Experimental, not fully implemented’ here we mean primarily that the structuring of a document into ‘DPart’ sections, as Form XObjects, is not handled by this package. This is possible with current pdfTeX software, but not yet in a way that lends itself easily to full automation, due to requirements of knowing the internal object number of certain internal PDF constructs. All the other aspects: PDFInfo declaration, Metadata and Color Profile, of the PDF/VT variants are correctly handled.

2.1.5. PDF/X options

PDF/X is an ISO standard intended for graphics interchange. It emphasizes printing-related requirements, such as embedded fonts and color profiles. The PDF/X standard has a large number of variants and conformance levels. The basic variants are X-1, X-1a, X-3, X-4, and X-5. (Note that a revised version of the X-2 standard was published in 2003 but withdrawn as an ISO standard in 2011, basically due to lack of interest in using it). The PDF/X-1a standard exists in revisions of 2001 and 2003, the PDF/X-3 standard exists in revisions of 2002 and 2003, and the PDF/X-4 and PDF/X-5 standards exist in revisions of 2008 and 2010. Moreover, some of these standards have a ‘p’ version, which permits the use of an externally supplied color profile (instead of an embedded one), and/or a ‘g’ version, which permits the use of external graphical content. Moreover, PDF/X-5 has an ‘n’ version, which extends PDF/X-4p by permitting additional ‘Custom’ color spaces other than Grayscale, RGB, and CMYK. For many typical uses of PDF/X, it is sufficient to use PDF/X-1a.

- x-1: generate PDF/X-1; now obsolete, doesn’t validate.

- `x-1a`: generate PDF/X-1a. Options `x-1a1` and `x-1a3` are also available to specify PDF/X-1a:2001 or PDF/X-1a:2003 explicitly.
- `x-2`: generate PDF/X-2; unpublished, doesn't validate.
- `x-3`: generate PDF/X-3. Options `x-302` and `x-303` are also available to specify PDF/X-3:2002 or PDF/X-3:2003 explicitly.
- `x-4`: generate PDF/X-4. Options `x-408` and `x-410` are also available to specify PDF/X-4:2008 or PDF/X-4:2010 explicitly.
- `x-4p`: generate PDF/X-4p. Options `x-4p08` and `x-4p10` are also available to specify PDF/X-4p:2008 or PDF/X-4p:2010 explicitly.
- `x-5g`: generate PDF/X-5g. Options `x-5g08` and `x-5g10` are also available to specify PDF/X-5g:2008 or PDF/X-5g:2010 explicitly.
- `x-5n`: generate PDF/X-5n. Options `x-5n08` and `x-5n10` are also available to specify PDF/X-5n:2008 or PDF/X-5n:2010 explicitly. Experimental, not fully implemented.
- `x-5pg`: generate PDF/X-5pg. Options `x-5pg08` and `x-5pg10` are also available to specify PDF/X-5pg:2008 or PDF/X-5pg:2010 explicitly.

2.1.6. Other options

These options are experimental and should not normally be used.

- `useBOM`: generate an explicit UTF-8 byte-order marker in the embedded XMP metadata, and make the XMP packet writable. Neither of these features are required by the PDF/A standard, but there exist some PDF/A validators (reportedly validatepdfa.com) that seem to require them. Note: the implementation of this feature is experimental and may break with future updates to the `xmptoincl` package.
- `noBOM`: do not generate the optional byte-order marker. (default)
- `noerr`: avoids stopping when making PDF/X with an RGB profile, and at other unusual situations; e.g., PDF/UA without also PDF/A.
- `pdf12`: use PDF 1.2, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- `pdf13`: use PDF 1.3, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- `pdf14`: use PDF 1.4, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- `pdf15`: use PDF 1.5, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- `pdf16`: use PDF 1.6, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.
- `pdf17`: use PDF 1.7, overriding the version specified by the applicable standard. This may produce a non-standard-conforming PDF file.

2.1.7. XMP language options

These options allow for characters in alphabets other than those used for English and Western European languages to be used within the `.xmldata` file (see Section 2.2), supported through \TeX character representation macros.

- `latxmp`: extended Latin blocks, `Ux0180–Ux024F` and `Ux1E00–Ux1EFF`

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- **armxmp**: armenian letters and ligatures, Ux0530–Ux058F, via macros `\armyba`, `\armfe`, `\armcomma`, etc.
- **cyrxmp**: cyrillic letters and accents, Ux0400–Ux04FF and Ux0500–Ux0527 via macros `\cyr`, `\CYRN`, etc.
- **grkxmp**: greek letters and diacritics, Ux0370–Ux03FF and Ux1F00–Ux1FFF via macros `\textalpha`, `\textPi`, etc.
- **hebxmp**: some hebrew letters and marks, Ux05C0–Ux05F4 via macros `\hebalef`, `\hebtav`, `\doubleyod`, etc.
- **arbxmp**: some arabic letters and marks, Ux0600–Ux06FF via macros `\hamza`, `\alef`, `\sukun`, etc.
- **vnmxmp**: vietnamese letters and accents, Ux1EA0–Ux1EFF via macros `\abreve`, `\uhorn`, `\ECIRCUMFLEX`, etc.
- **ipaxmp**: phonetic extensions, Ux0250–Ux02AF and Ux1D00–Ux1DFF
- **mathxmp**: mathematical letters, symbols, operators arrows, alphanumeric forms.
- **allxmp**: all of the above, as well as those listed next; used primarily for testing compatibility with other packages.

The characters supported by these options include those supported by `hyperref.sty` via the PDFdoc encodings (PD1 and PU) for inclusion in PDF files. Extra support is provided for math alphabets. For Armenian, the macros defined by ArmT_EX are supported.

Further options allow direct (enclosed) input of upper 8-bit characters, from encodings such as Latin-1–Latin-9, KOI8-R, LGR (Greek), ArmSCII8, and a few more. Use of these requires a carefully controlled parsing regime. Here we list the package options that declare such content may be present in the `.xmldata` file. A detailed account of how these are used is given in Section 4.1 (“Multilingual Metadata”).

- **LATxmp**: support for direct use of the upper-range characters (byte codes 160–255) for input encodings Latin1–Latin9, for Latin-based alphabets as used in European countries and elsewhere. This defines parser macros `\textLAT`, `\textLII`, ..., `\textLIX`. All support from `latxmp` is loaded also.
- **KOIXmp**: support for direct use of cyrillic letters by use of upper-range characters (byte codes 148–255) under input encodings KOI8-R and KOI8-RU, using `\textKOI` as parser macro. All support from `cyrxmp` is loaded also.
- **LGRxmp**: support for greek letters entered using either the LGR input transliteration of ASCII characters, or the ISO-8859-7 encoding of upper-range characters (byte codes 160–255), or a combination of both, using `\textLGR` as parser macro. All support from `grkxmp` is loaded also.
- **AR8xmp**: support for armenian letters entered using the ArmT_EX 2.0 input transliteration of ASCII characters, or the ArmSCII8 encoding of upper-range characters (byte codes 160–255), or a combination of both, using `\textARM` as parser macro. All support from `armxmp` is loaded also.
- **HEBxmp**: support for hebrew letters entered using either LHE input transliteration of ASCII characters, or the CP1255, CP862 or ISO-8859-8 (HE8) encoding of upper-range characters (byte codes 160–255), or a combination of these using `\textLHE`, `\textHEBO`, `\textHEB` as parser macros. All support from `hebxmp` is loaded also.

These ‘parser’ options have received limited testing, so please report any mistakes in the UTF-8 output that you may encounter.

2.2. Data file for metadata

As mentioned above, standards-compliant PDF documents require document-level metadata to be included. This, known as an ‘XMP packet’ [2, 15], is like having a library catalog card included within the PDF itself. It is an unencrypted portion of the PDF file, with data expressed in Extensible Markup Language (XML), using Resource Description Format (RDF [28]) syntax, encoded as UTF-8 so readable by any text editing software on any modern computing platform.

Some advantages of doing this are clear.

- For a librarian: cataloguing information is available within the file itself, without the need to search explicitly in the visual layout of the content or elsewhere;
- All actual libraries cataloguing this PDF can have consistent information; including web-based indexing sites such as Google.
- For the author(s): who can specify the kind of information most appropriate to help readers understand the nature and purpose of the document.

The pdfx package builds the XMP metadata from information supplied via a special data file called `\jobname.xmpdata`. Here, `\jobname` is usually the basename of the document’s main `.tex` file. For example, if your document source is in the file `main.tex`, then the metadata must be in a file called `main.xmpdata`. None of the individual metadata fields are mandatory, but for most documents, it makes sense to specify at least the title and the author. For more technical aspects of metadata and its uses, consult the work of the Dublin Core Initiative [6] and PRISM [26].

Here is a short `.xmpdata` file:

```
\Title{Baking through the ages}
\Author{A. Baker\sep C. Kneader}
\Language{en-GB}
\Keywords{cookies\sep muffins\sep cakes}
\Publisher{Baking International}
```

You should note that multiple authors and keywords have been separated by `\sep`. This `\sep` macro serves a technical purpose and is permitted within the `\Author`, `\Keywords`, and `\Publisher` fields, as well as some others. See §2.3 below for a complete listing of the supported author-supplied metadata fields.

After processing, the local directory contains a file named such as `pdfa.xmpi` or `pdfe.xmpi` or `pdfx.xmpi` according to the PDF variant desired. This file is the complete XMP Metadata packet. It can be checked for validity, using an online validator, such as at www.pdflib.com.

Warning: The `\jobname.xmpdata` file may be included in the main document source, within a `{filecontents*}` environment, provided this comes *before* the `\documentclass` command, as follows.

```
\begin{filecontents*}{\jobname.xmpdata}
\Title{Baking through the ages}
\Author{A. Baker\sep C. Kneader}
\Language{en-GB}
\Keywords{cookies\sep muffins\sep cakes}
\Publisher{Baking International}
\end{filecontents*}
\documentclass[11pt,a4paper]{article}
...
```

Including the metadata with the \TeX source is very convenient. Having it at the top of the file also brings attention to it, placing emphasis on the desirability of including metadata, and

keeping it accurate while the main content of the document is subject to changes or revision. Macro definitions can also occur prior to the `\documentclass` command, including any that may be needed within the metadata. An example of this is apparent in Figure 2 occurring later.

However, this ordering is also extremely important, else any non-ascii UTF-8 byte sequences can become active characters and expand upon data being written out, rather than remaining as inactive bytes. If you edit the metadata supplied this way, remember to remove the existing copy of `\jobname.xmpdata` file before the next processing run, as \TeX does not write a new copy of the file when it exists on disk already, within the current working directory or elsewhere that \TeX may find. In development or testing situations the filename may need to be given as `./\jobname.xmpdata`, else an older version may be loaded in error.

Experienced users/programmers can employ the `\write18` mechanism³, together with the `--shell-escape` command-line option, to automatically execute a shell command that removes `\jobname.xmpdata` on every (or on selected) processing runs. This is only useful when the metadata changes, for whatever reason.

Other places for the `{filecontents*}` environment can work, but *only* when it contains *no* non-ascii UTF-8 byte sequences. Since 2018, with default See Section 2.4 below for more information on the macros that can be safely used within `.xmpdata` metadata files.

2.3. List of supported metadata fields

Following is a complete list of user-definable metadata fields currently supported, separated into particular groupings. Each command is accompanied by the specific XML tagged field name (with namespace) that is placed into the document-level Metadata packet, as well as the kind of information being conveyed. More may be added in the future. These commands can *only* be used within the `.xmpdata` file.

Most commands take an optional argument specifying the natural language, using RFC5646 (BCP 47) [7] codes, in which the metadata field is given. Languages for multiple entries can use e.g., `\sep[de]` Only those fields requiring a specific format (e.g. dates) do *not* support language specifiers; these are indicated with ^f. Fields allowing more than one value are indicated with *. Multiple values may be given as separate instances of the macro, or as a single instance with the values delimited by `\sep`, as in the example above.

2.3.1. General information:

- `*\Author:` (dc:creator)
the document's human author(s). Separate multiple authors with `\sep`.
- `*\Title:` (dc:title)
the document's title; multiple language versions are supported.
- `*f\Language:` (dc:language)
list of languages used within the document.
- `*\Keywords:` (dc:subject)
list of keywords, separated with `\sep`.
- `*\Publisher:` (dc:publisher)
the publisher(s). Multiple pieces in a publishing chain should be separated with `\sep`.
- `*\Subject:` (dc:description)
the abstract, or short description.

³If you don't already know what this is, they you probably should not try using it :-).

- Introduction
- Usage
- Installing
- Multilingual and Technical Considerations
- Bibliography
- References
- Implementation
- Index
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2.3.2. Copyright information:

- \Copyright: (dc:rights)
a copyright statement.
- ^f\CopyrightURL: (xmpRights:WebStatement)
location of a web page describing the owner and/or rights statement for this document.
- ^f\Copyrighted: (xmpRights:Marked)
‘True’ if the document is copyrighted, and ‘False’ if it isn’t. This is automatically set to ‘True’ if either \Copyright or \CopyrightURL is specified, but this can be overridden. For example, if the copyright statement is ‘Public Domain’, then specify also \Copyrighted{False}.
- *\Owner: (xmpRights:Owner)
specifies the owner(s) of the document or resource.
- ^f\CertificateURL: (xmpRights:Certificate)
gives the URL to online proof of ownership, if available.

2.3.3. more Dublin Core metadata:

From version 1.6 of pdfx.sty, the following fields can be used to provide a greater range of information to be specified as metadata.

- *\Contributor: (dc:contributor)
contributor(s) other than author(s) of the PDF document.
- \Coverage: (dc:coverage)
statement about the extent or scope of the document’s contents.
- ^f\Date: (dc:date)
date(s) when something significant occurred relating to the resource (e.g., version changes); must be in ISO date format YYYY-MM-DD or YYYY-MM.
- ^f\PublicationType: (dc:type)
The type of publication. If specified, must be one of ‘book’, ‘catalog’, ‘feed’, ‘journal’, ‘magazine’, ‘manual’, ‘newsletter’, ‘pamphlet’. This is automatically set to ‘journal’ if \Journaltitle is specified (see below), but can be overridden.
- *\Relation: (dc:relation)
how this PDF or resource relates to other document(s) or resources.
- ^f\Source: (dc:source)
specifies a source document from which the PDF is derived.
- ^f\Doi: (dc:identifier, prism:doi, prism:url)
Digital Object Identifier (DOI) for the document, without the leading ‘doi:’.
- ^f\ISBN: (dc:identifier)
the ISBN for the PDF itself, or Book/Monograph of which it is part.
- ^f\URLlink: (dc:identifier, prism:url)
gives a URL address for an online copy of the document.

The remaining Dublin Core field (dc:format) is always set to ‘application/pdf’.

2.3.4. Publication information:

The following macros allow for inclusion of publication related metadata fields, as specified by PRISM [26] to meet publishing requirements.

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- `\Journaltitle:` (prism:issueName)
The title of the journal in which the document was published.
- `f\Journalnumber:` (prism:issn)
The ISSN for the journal/series in which the document was published.
- `f\Volume:` (prism:volume)
Journal volume.
- `f\Issue:` (prism:number)
Journal issue/number.
- `f\Firstpage:` (prism:startingPage, prism:pageRange)
First page number of the published version of the document.
- `f\Lastpage:` (prism:endingPage, prism:pageRange)
Last page number of the published version of the document.
- `\CoverDisplayDate:` (prism:coverDisplayDate)
Date on the cover of the journal issue, as a human-readable text string.
- `f\CoverDate:` (prism:coverDate)
Date on the cover of the journal issue, in a format suitable for storing in a database field with a ‘date’ data type; e.g. YYYY-MM, or YYYY-MM-DD.

This is an area which can be expanded, to deal with more kinds of publication and metadata fields. The ExtensionSchema [23] technique is used to add new fields. Examples of this can be found in the template files pdfx.xmp, pdfa.xmp, pdfa.xmp.

2.3.5. Backward Compatibility

The following macros are also recognised, for backward compatibility with earlier versions of the package.

- `*\AuthoritativeDomain:` (pdfx:AuthoritativeDomain)
specifies extra names (e.g., of companies) associated to the existence of the PDF or resource.
- `\Creator:` (xmp:CreatorTool)
synonymous with `\CreatorTool` which is usually handled automatically anyway, but can be over-ridden.
- `\Org:` synonymous with `\Publisher`.
- `\WebStatement:` synonymous with `\CopyrightURL`.

2.3.6. more XMP metadata:

- `*\Advisory:` (xmp:Advisory)
noteworthy information; e.g., revision data or changes.
- `f\BaseURL:` (xmp:BaseURL)
base-URL for relative hyperlinks within the PDF.
- `*\Identifier:` (xmp:Identifier)
more advance forms than (dc:identifier); see [2, 15].
- `\Nickname:` (xmp:Nickname)
a pseudonym or ‘nickname’ as a colloquial identifier for the resource.
- `*\Thumbnails:` (xmp:Thumbnails)
allows small page images to be associated with each page of the PDF. An appropriate XML-compatible representation is required for such images.

2.3.7. PDF standards metadata:

The following metadata fields are generated automatically by the \TeX engine. Some are dependent on the particular loading options that specify the desired compliance with a PDF standard, and level of conformance. There are no separate user-macros to alter these. The first three dates are usually set to be identical.

- (xmp:CreateDate) : creation date&time of the PDF.
- (xmp:MetadataDate) : creation date&time of the Metadata for the PDF.
- (xmp:ModifyDate) : date&time of latest modifications to the PDF.
- (xmpMM:DocumentID) : unique identifier for the PDF, based on MD5 sum.
- (xmpMM:InstanceID) : unique identifier based on creation date&time.
- (pdf:Producer) : \TeX engine used; either ‘Lua \TeX ’, ‘Xe \TeX ’, ‘pdf \TeX ’.
- (pdf:Trapped) : currently always set to ‘False’.
- (pdfaid:part) : 1, 2 or 3 for PDF/A-?
- (pdfaid:conformance) : a, b or u for PDF/A-??
- (pdfuaid:part) : currently 1 for PDF/UA-1
- (pdf:ISO_PDFAVersion) : currently 1 for PDF/E-1
- (pdf:Version) : PDF/X-1, PDF/X-2 or PDF/X-3
- (pdfx:GTS_PDFXVersion) : e.g., PDF/X-1a:2003 up to PDF/X-3 ; but no year for PDF/X-4 and PDF/X-5 variants
- (pdfx:GTS_PDFXConformance) : e.g., PDF/X-1a:2003 up to PDF/X-2
- (pdfxid:GTS_PDFXVersion) : e.g., PDF/X-4p:2008 after PDF/X-3
- (pdfvtid:GTS_PDFVTVersion) : e.g., PDF/VT-2s for PDF/VT
- (pdfvtid:GTS_PDFVTModDate) : same as xmp:ModifyDate

2.4. Symbols permitted in metadata

Within the metadata, all printable ASCII characters except `\`, `{`, `}` and `%` represent themselves. Also, all printable Unicode characters from the basic multilingual plane (i.e., up to code point U+FFFF) can be used directly with the UTF-8 encoding. (Please note: encodings other than UTF-8 are not supported in the metadata, except as arguments to ‘parser-macros’; see Section 2.1.7). Consecutive whitespace characters are combined into a single space. Whitespace after a macro such as `\copyright`, `\backslash`, or `\sep` is ignored. Blank lines are not permitted. Moreover, the following markup can be used:

- “`\`” : a literal space (for example after a macro)
- `\%` : a literal `%`
- `\{` : a literal `{`
- `\}` : a literal `}`
- `\backslash` : a literal backslash `\`
- `\copyright` : the copyright symbol ©

The macro `\sep` is permitted within `\Author`, `\Keywords`, `\Publisher`, and other macros marked with * above. Its purpose is to separate multiple authors, keywords, etc. to appear as separate list items appropriately and consistently in the different ways that such information is represented within the PDF file. The package takes care of this when `\sep` is used. For example, in the XMP metadata, it expands as `</rdf:li><rdf:li>` tagging.

2.4.1. PDF Info strings

When `\sep` is not used within its argument, the metadata from `\Title`, `\Author` and `\Keywords` is also included in the PDF `/Info` dictionary. When this is the case, validation for the declared standard will occur only if the corresponding `/Info` item and XMP metadata field convert to exactly the same Unicode string. This cannot happen when `\sep` is used, so the `/Info` items are then not populated.

Unfortunately not all PDF browsers (in particular, older ones and much Apple software) give ready access to the XMP metadata packet. Some authors want to see everything using e.g., the Unix/Linux command: `pdfinfo -enc UTF-8`. In fact there is the `-meta` option to get the complete metadata packet (in UTF-8 encoding). This can give more than what one wants, so use it as follows:

```
pdfinfo -meta <filename>.pdf | grep 'dc:'
```

to extract just the Dublin Core metadata fields.

Another possibility is to *not* use `\sep` with multiple authors and/or keywords. Instead replace it with simply `,`. We do not recommend doing this, as more sophisticated metadata tools will see the result as a single value, rather than multiple authors, say. Different language codes cannot be applied when done this way. However, some authors may find this a satisfactory solution that suits their own tools.

2.5. Macros permitted in metadata

Other T_EX macros actually can be used, provided the author is very careful and not ask for too-complicated T_EX or L^AT_EX expansions into internal commands or non-character primitives; basically just accents, macros for Latin-based special characters, and simple textual replacements, perhaps with a simple parameter. A special macro `\pdfxEnableCommands{...}` is provided to help resolve difficulties that may arise.

Here is an example⁴ of the use of `\pdfxEnableCommands`, which occurs with the name of one of our authors (Hàn Thế Thành) due to the doubly-accented letter ê. It is usual to define a macro such as: `\def\thanh{H\`an Th\`{\`e} Thanh}`. In previous versions of the pdfx package, use of such a macro within the `.xmpdata` file, in the Copyright information say, could result in the accent macros expanding into internal primitives, such as

```
H\unhbox \voidbex \bgroup \let \unhbox \voidbex \setbox \@tempboxa ...
```

going on for many lines. This clearly has no place within the XMP metadata. To get around this, one could try using simplified macro definitions

```
\pdfxEnableCommands{
  \def\`#1{#1^cc^80}\def\'#1{#1^cc^81}\def\^#1{#1^cc^82}}
```

where the `^cc^80`, `^cc^81`, `^cc^82` cause T_EX to generate the correct UTF-8 bytes for ‘combining accent’ characters.

This works fine for metadata fields that appear just in the XMP packet. However, it is not sufficient for the PDF `/Author` key, which must exactly match with the `dc:creator` metadata element. What is needed instead is

```
\pdfxEnableCommands{
  \def\thanh{H^c3^aa0n Th\eee Thanh}\def\eee{^c3^aa^cc^81}}
```

or the above with ‘à’ typed directly as UTF-8 instead of `^c3^aa0` and ‘ê’ in UTF-8 for `^c3^aa`.

⁴Other use cases are discussed with regard to Figures 12 and 16.

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The reason for this is due to the `\pdfstringdef` command, which constructs the accented latin letters as single combined characters à and ê, without resorting to combining accents, wherever possible. If the Metadata does not have the same, irrespective of Unicode normalisation, then validation fails.

With version (1.5.6) of the `pdfx` package, such difficulties have been overcome, at least for characters used in Western European, Latin-based languages. The input encoding used when reading the `.xmpdata` file now includes interpretations of TeX’s usual accent commands to produce the required UTF-8 byte sequences.

Since version (1.5.8) this input encoding was extended to include macro definitions covering TeX’s internal character representation of other alphabets (e.g., extended Latin, Cyrillic, Greek, etc.). However this can become memory intensive, requiring a large number of macro definitions, most of which will never be used. So loading options are provided, enabling a document author to choose only those that may be relevant. Currently these are as in Section 2.1.7.

A significant portion of the Unicode Basic Plane characters can be covered this way. Modules could even be provided for CJK character sets and mathematical symbols, etc. However, as this can become memory intensive, significant testing will be required before these become a standard part of the `pdfx` package.

2.6. Color profiles

Most standards compliant PDF documents require a *color profile* to be embedded within the file. In a nutshell, such a profile determines precisely how the colors used in the document will be rendered when printed to a physical medium. This can be used to ensure that the document will look exactly the same, even when it is printed on different printers, with different paper types, etc. The inclusion of a color profile is necessary to make the document completely self-contained.

Since most TeX users are not graphics professionals and are not particularly picky about colors, the `pdfx` package includes default profiles that will be included when nothing else is specified. Therefore, the average user doesn’t have to do anything special about color.

For users who have a specific color profile they wish to use, it is possible to do so by including a `\setRGBcolorprofile` or `\setCMYKcolorprofile` command in the `.xmpdata` file. Note that PDF/A and PDF/E require a profile of type ‘mnr’ (monitor) which is usually an RGB color profile, while PDF/X and PDF/VT require type ‘prtr’ (printer) which is usually a CMYK color profile; but valid documents can be created with the correct type designed for the other color space. Use the following commands to specify an RGB or CMYK color profile, respectively:

```
\setRGBcolorprofile{<filename>}{<identifier>}{<info string>}{<registry URL>}
\setCMYKcolorprofile{<filename>}{<output intent>}{<identifier>}{<registry URL>}
```

Within the arguments of these macros, the characters <, >, &, ^, _, #, \$, and ~ can be used as themselves, but % must be escaped as \%.

From version (1.6) the default RGB and CMYK color profiles are now supplied using the `colorprofiles` package by Norbert Preining and Ross Moore [25]. Earlier versions of `pdfx.sty` set the defaults via:

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
\setRGBcolorprofile{sRGB_IEC61966-2-1_black_scaled.icc}
    {sRGB_IEC61966-2-1_black_scaled}
    {sRGB IEC61966 v2.1 with black scaling}
    {http://www.color.org}

\setCMYKcolorprofile{coated_FOGRA39L_arg1.icc}
    {Coated FOGRA39}
    {FOGRA39 (ISO Coated v2 300\% (ECI))}
    {http://www.argyllcms.com/}
```

These can still be used if the files from earlier version are available on your T_EX system, but they will need to be requested, as above. Other color profile files may be obtained from the International Color Consortium. Please take a look at <http://www.color.org/iccprofile.xalter>.

Alternatively, color profiles are shipped with many Adobe software applications; these are then available for use also with non-Adobe software. Now the pdfx package includes coding to streamline inclusion of these profiles in PDF documents, or to specify them as ‘external’ profiles, with PDF/X-4p and PDF/X-5pg variants. Two files `AdobeColorProfiles.tex` and `AdobeExternalProfiles.tex` are distributed with the pdfx package. The latter is for use with PDF/X-4p and PDF/X-5pg, which do not require color profiles to be embedded, while the former can be used with other PDF/X variants. Both define commands to use Color Profiles as follows.

| | |
|---------------------------------------|---------------------------------------|
| <code>\FOGRAXXXIX</code> | Coated FOGRA39 (ISO 12647-2:2004) |
| <code>\SWOPCGATSI</code> | U.S. Web Coated (SWOP) v2 |
| <code>\JapanColorMMI Coated</code> | Japan Color 2001 Coated |
| <code>\JapanColorMMI Uncoated</code> | Japan Color 2001 Uncoated |
| <code>\JapanColorMMI Newspaper</code> | Japan Color 2002 Newspaper |
| <code>\JapanWebCoatedAd</code> | Japan Web Coated (Ad) |
| <code>\CoatedGRACoL</code> | Coated GRACoL 2006 (ISO 12647-2:2004) |
| <code>\SNAPCGATSII</code> | CGATS TR 002 |
| <code>\SWOPCGATSIII</code> | CGATS TR 003 |
| <code>\SWOPCGATSV</code> | CGATS TR 005 |
| <code>\ISOWebCoated</code> | Web Coated FOGRA28 (ISO 12647-2:2004) |
| <code>\ISOCoatedECI</code> | ISO Coated v2 (ECI) |
| <code>\CoatedFOGRA</code> | Coated FOGRA27 (ISO 12647-2:2004) |
| <code>\WebCoatedFOGRA</code> | Web Coated FOGRA28 (ISO 12647-2:2004) |
| <code>\UncoatedFOGRA</code> | Uncoated FOGRA29 (ISO 12647-2:2004) |
| <code>\IFRAXXVI</code> | ISOnewspaper26v4 ISO/DIS 12647-3:2004 |
| <code>\IFRAXXX</code> | ISOnewspaper30v4 ISO/DIS 12647-3:2004 |

As of the time of first compiling this list, only the first six of these result in PDFs which can validate with external profiles (i.e., for PDF/X-4p and PDF/X-5pg) using the then-current versions of Adobe Acrobat Pro software. It is unclear whether the others (incl. `\IFRAXXVI` and `\IFRAXXX`) failed due to incorrect data or problems in the validation software. Since then, with updates to Acrobat Pro, almost all the others have been verified to work, except `\IFRAXXX` which seems no longer available. Thus these commands come with a ‘use at own risk’ clause.

For ‘external’ profiles, there is a command `\setEXTERNALprofile`, taking 9 arguments, that must be used. Consult `AdobeExternalProfiles.tex` for examples of its use.

All but the last of the macros listed above can also be used for valid embedded profiles, providing the corresponding files can be found. The following macros are used to set the (absolute or relative) path, on the local operating system, to the location of color profile files.

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```
\pdfxSetRGBcolorProfileDir{\path to RGB color profiles}  
\pdfxSetCMYKcolorProfileDir{\path to CMYK profiles}
```

On a Macintosh, there are various places where the color profiles may be found. One can use either a macro `\MacOSColorDir` which expands into the path for system-provided profiles:

```
/System/Library/ColorSync/Profiles/
```

or the macro `\MacOSLibraryColorDir` expanding to:

```
/Library/ColorSync/Profiles/
```

or `\AdobeMacOSDir` which expands into the path:

```
/Library/Application Support/Adobe/Color/Profiles/Recommended/
```

Under Windows an available macro is `\WindowsColorDir` which expands to:

```
C:\Windows\System32\Spool\Drivers\Color/
```

being the common location for color profiles. Use these within the `.xmpdata` file as, e.g.,

```
\pdfxSetCMYKcolorProfileDir{\AdobeMacOSDir}
```

Authors may change the paths to suit their own circumstances, either *before* loading `pdfx.sty` or within the `.xmpdata` file.

PDF/A and PDF/E usually need an RGB profile, while PDF/X and PDF/VT require a CMYK profile. It is possible to use a CMYK profile with PDF/A or PDF/E by specifying `\setRGBcolorprofile{}{}{}{}` in the `.xmpdata` file. Beware however, that with PDF/A any coloured hyperlink annotations can cause a validation problem, as these are interpreted as RGB colours even when 4 components are given. This may be a bug in validators, as PDF specifies that the number of components should match the color space.

2.6.1. ‘Custom’ color spaces

It is also possible to specify ‘Custom’ color spaces, other than RGB or CMYK. Here is an example command `\viiIndigoTAC`, defined as follows:

```
%% Custom profile: 7C Indigo TAC370 (ColorLogic)  
\gdef\viiIndigoTAC{\let\CallasMacOSpdfaPilotdir  
\setCUSTOMcolorprofile  
  {7C Indigo_TAC370_ColorLogic.icc}%  
  {\CallasProfilesdir}%  
  {7C Indigo TAC370 \string\{ColorLogic\string\}}% /ProfileName  
  {http://www.colorlogic.de}% /RegistryName  
  {7CLR}% number of colors specifier  
  {02400000}% ICC version  
  {/Cyan /Magenta /Yellow /Black /Orange /Green /Violet}% colour names  
  {48110b8b410ee6be015f3932c3167869}% CheckSum  
}
```

which uses a profile that accompanies the `pdfaPilot` software from Callas Software GmbH [5]. The macro `\CallasMacOSpdfaPilotdir`, defined in the file `CallasColorProfiles.tex`, specifies the directory where this Custom profile is located, when installed under MacOS. One

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needs to `\input CallasColorProfiles.tex` *before* loading the pdfx package. Macros for other directories are also defined in this file.

2.7. Notes on the internal representation of metadata

Within the PDF file, metadata is deposited in two places: some data goes into the native PDF /Info dictionary, and some data goes into an XMP packet stored separately within the file. XMP is Adobe's Extensible Metadata Platform [2, 15], and is an XML-based format. See [Adobe XMP Development Center](#) for more exhaustive information about XMP. An XMP Toolkit SDK which supports the GNU/Linux, Macintosh and Windows operating systems is also available under modified BSD licence.

Some of the metadata, such as the author, title, and keywords, can be stored *both* in the XMP packet and in the /Info dictionary. For the resulting file to be standards-compliant, the two copies of the data must be identical. This is taken care of automatically by the pdfx package, except when `\sep` is used to handle multiple entries, as discussed above in §2.4.1. In such cases the string is not included within the /Info dictionary. Note that this is in accordance with the PDF 2.0 specification [21], which deprecates use of the /Info dictionary for such metadata.

In principle, users can resort to alternate ways to create an XMP file for inclusion in PDF. In this case, one should create a customised template file `pdfa.xmp` or `pdfx.xmp` or `pdfe.xmp` (etc., depending on the PDF flavor) containing the pre-defined data. This can be done by modifying the ones supplied with the pdfx package. However, this is an error-prone process and is *not* recommended for most users. If there is a particular field of metadata that you need and that is not currently supported, please contact the package authors.

pdfx makes use of the `xmpincl` package to include XMP data into the PDF. The documentation of `xmpincl` package may help interested users to understand the process of XMP data inclusion.

2.8. Tutorials and technical notes

A tutorial with step-by-step instructions for generating PDF/A files can be found at: <http://www.mathstat.dal.ca/~selinger/pdfa/>.

Some technical notes about production problems the authors have encountered while generating PDF/A compliant documents are available here: http://support.river-valley.com/wiki/index.php?title=Generating_PDF/A_compliant_PDFs_from_pdftex. Be aware that this is based on use of an earlier version of the pdfx package, so some of the advice may have been superseded.

3. Installing

The `pdfx.dtx` package is available on CTAN as usual, via <http://ctan.org/pkg/pdfx>. It is also included in T_EX distributions such as MacT_EX, T_EX Live and MiK_TE_X. Thus most users will not need to handle installation at all.

For those wishing to do a manual installation, here are some notes. The file `pdfx.dtx` is a composite document of program code and documentation in L^AT_EX format, in the tradition of *literate programming*. After having installed the package, to get the documentation that you are reading now, run (PDF)L^AT_EX on the file `pdfx.dtx`. The resulting PDF should be valid as PDF/A-2u. Or better, use the included `Makefile`, which will also regenerate the index.

To install the package, first extract the program code; i.e., the file `pdfx.sty`, by running L^AT_EX or T_EX on the file `pdfx.ins`. Create a directory named `pdfx` under `$TEXMF/tex/latex` and copy the files `pdfx.sty`, `8bit.def`, `glyptounicode-cmr.tex`, `glyptounicode-ntx.tex` as well as the other `*.tex`, `l8u*-penc.def` and `*.xmp` files, into it. Then update T_EX's file database using the appropriate command for your distribution and operating system (such as `texhash` or `mktextlsr`, or similar).

3.1. Limitations and dependencies

The pdfx.sty package works with pdfTeX and also LuaTeX and XeTeX with some minor limitations. It further depends on the following other packages.

1. xmpincl for insertion of metadata into PDF.
2. inputenc to establish input-encoding infrastructure — see Section 4.2.
3. hyperref for ensuring data is correctly encoded when being written into the PDF file, and supporting features such as hyperlinking, bookmarks, etc.
4. xcolor for ensuring consistent use of the color model appropriate the PDF variant, within text and hyperlinks (when allowed).
5. glyphtounicode.tex (not XeTeX) maps glyph names to corresponding Unicode code-points.
6. ifluatex allowing coding specific to LuaTeX.
7. ifxetex allowing coding specific to XeTeX.
8. luatex85 or pdftexcmds (LuaTeX only) for access to primitive commands using pdfTeX macro names.
9. stringenc used to help generate proper bookmarks with transliterated input; e.g., with \textLGR or \textARM — see Section 4.1.4.

Other files and packages are loaded as sub-packages or as configuration files for these. Since some of these packages may be loaded by existing documents we provide here advice on how to deal with potential loading and option conflicts.

Firstly, it is best if pdfx is the first package loaded; e.g., directly after the \documentclass line. This is not a strict requirement, but it is worthwhile to deal with the metadata at the top of your TeX source, allowing correct options to be loaded to cope with validation aspects.

Secondly, replace \usepackage[<options>]{hyperref} with \hypersetup{<options>}. This deals with most loading issues with the hyperref package. Note that PDF/X is a format intended for printing. It forbids inclusion of hyperlinks and other actions, including via bookmarks. To produce a validating PDF/X document, pdfx overrides internal macros while keeping colors associated with link anchors. To inhibit these colors also, you could specify options as follows.

```
\hypersetup{colorlinks,allcolors=black}
```

Furthermore, options to set metadata components (such as pdfauthor, pdftitle, pdfsubject, pdfkeywords, etc.) are disabled, since pdfx has already taken care of this information.

Thirdly, conflicts with other packages may be dealt with by simply changing \usepackage to \RequirePackage within the document's preamble. But this may not be possible when the \usepackage or \RequirePackage command occurs within another package, or with a specific set of options, thereby causing processing to stop. Few packages have a command analogous to \hypersetup. Instead \PassOptionsToPackage{<options>}{<package>} can help. For <options> specify the ones associated with the loading yet to come. This can give a smooth processing run, but you'll need to check whether the results from those options have actually taken effect. Some examples of this can be seen later, in Figures 2 and 8.

3.1.1. Limitations using XeTeX

To process a file using XeTeX, to produce a document that can validate to a particular PDF standard, one need to use a command to run the TeX engine, as follows.

```
xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename>.tex
```

The `-shell-escape` option allows a command-line task to be run, which writes the creation date & time of the running job into a small file on disk. This data, written in a specific format, is then read by the job for inclusion into several metadata fields. This emulates the result of pdfTeX's `\pdfcreationdate` primitive. As there are security implications in allowing arbitrary commands to be run, this need for `-shell-escape` must be viewed as imposing a limitation on the work-flows in which this can be safely used.

The `-output-driver="xdvipdfmx -z 0"` suppresses compression, which is not allowed for the XMP metadata packet. Without this, the resulting PDF may fail to pass validation tests.

XeTeX is designed for processing UTF-8 input only. When presented with \TeX source using a legacy encoding, such as `latin2` or `koi8-r`, the input is accepted and a PDF produced. Yet there will be garbage characters corresponding to each character entered from the upper range (128–255). This is evident in the PDF content and bookmarks; yet pdfx produces the correct XMP metadata packet. So while the techniques explained later in Section 4.1 are valid, the PDF itself does not contain correct content.

Not all fonts, in particular Open-Type fonts (OTF), naturally come with mappings of the glyphs to Unicode code points. This is a requirement with PDF/A, PDF/E and PDF/UA standards. Use of such fonts can result in validation errors, such as:

- CIDset in subset font is incomplete (font contains glyphs that are not listed).
- Type 2 CID font: CIDToGID map is invalid or missing.

If one has access to Adobe's Acrobat Pro software, then its Preflight utility can rewrite the uncompressed output from Xe \TeX into a valid PDF standard, using compression of the contents but not of the XMP packet. Similarly Preflight can sometimes fix the missing font information.

3.1.2. Limitations using Lua \TeX

Lua \TeX can handle the OTF font issues mentioned for Xe \TeX , so can produce valid PDF/A documents where Xe \TeX fails. However, since Lua \TeX expects all input source to be UTF-8-encoded, it cannot work at all with documents using older legacy encodings. Instead one gets error messages such as:

```
! String contains an invalid utf-8 sequence.
1.5 \Copyright{\textLIII{UWAGA dla recenzent
                                     iżew/tâiumaczy}}
?
```

from a document using `latin2` encoded characters. Thus most of Section 4.1 is just not applicable for Lua \TeX , whereas it is for pdf \TeX . This is essentially the same problem as described above for Xe \TeX , but here Lua \TeX advises that there are problems as soon as it encounters an invalid (for UTF-8) character. Some would regard this as better than having the job run to completion, only to later discover garbage content within the PDF.

3.2. Files included

The following files are included in the package. Some can be created from `pdfx.dtx`, using the Makefile.

3.2.1. Package files

- `pdfx.sty` — main package file generated from `pdfx.dtx`.

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- pdfa.xmp — specimen xmp template for PDF/A.
- pdfe.xmp — specimen xmp template for PDF/E.
- pdfvt.xmp — specimen xmp template for PDF/VT.
- pdfx.xmp — specimen xmp template for PDF/X.
- 8bit.def — custom input encoding.
- 18u-penc.def — input encoding macro declarations.
- 18uarb-penc.def — input macro declarations for Arabic.
- 18uarm-penc.def — input macro declarations for Armenian.
- armglyphs.dfu — Unicode mapping for Armenian letters.
- 18ucyr-penc.def — input macro declarations for Cyrillic alphabet.
- 18udev-penc.def — input macro declarations for Devanagari.
- 18ugrk-penc.def — input macro declarations for Greek alphabet.
- 18uheb-penc.def — input macro declarations for Hebrew alphabet.
- 18ulat-penc.def — input macro declarations for Latin 1–9 encodings.
- 18umath-penc.def — input macro declarations for mathematical symbols.
- glyphtounicode-cmr.tex, glyphtounicode-ntx.tex — maps glyph names to corresponding Unicode for Computer Modern and other T_EX-specific fonts.
- AdobeColorProfiles.tex — macros for inclusion of Adobe-supplied color profiles.
- AdobeExternalProfiles.tex — macros for use of external color profiles.
- CallasColorProfiles.tex — macros for profiles included with Callas pdfaPilot software.

3.2.2. Documentation & Examples

- README — usual top-level information.
- manifest.txt — file list.
- pdfx.pdf — package documentation.
- sample.tex, sample.xmpdata — a sample file with sample metadata.
- small2e-pdfx.tex — sample file with included metadata.

3.2.3. Sources

- src/pdfx.dtx — composite package and documentation.
- src/pdfx.ins — installer batch file.
- src/pdfx.xmpdata — metadata for the documentation.
- src/rvdtx.sty — used by pdfx.dtx.
- src/Makefile — a Makefile for building the documentation.
- src/MANIFEST — list of files in this directory.
- src/text89.def — used with Figure 13 in the documentation.
- src/{arm-start,koi8-example,koi8-example2,latin2-example}.tex — used in the documentation with figures showing example coding.
- src/{TL-POL-meta,TL-RU-LICRs,TL-RU-metadata,TL-RU-toc,Armenian-example-UTF8,armtex-meta,usage-meta,math-assign5}.png — screenshot images showing multilingual and other metadata.

3.3. Miscellaneous information

The package is released under the L^AT_EX Project Public Licence. Bug reports, suggestions, feature requests, etc., may be sent to the original authors at cvr@river-valley.org and/or thanh@river-valley.org, or to the more recent contributors at ross.moore@mq.edu.au and/or selinger@mathstat.dal.ca.

4. Multilingual and Technical Considerations

T_EX and L^AT_EX have an on-going practice of including metadata within the source files and package documentation. Usually this is done as comments at the beginning of the file; such as the following from the English language version of the 2015 T_EX Live documentation⁵.

```
%Id: texlive-en.tex 37205 2015-05-05 21:36:33Z karl $
%TeX Live documentation. Originally written by Sebastian Rahtz and
%Michel Goossens, now maintained by Karl Berry and others.
%Public domain.
```

This provides information, ideally suited for copyright metadata fields, as in Section 2.3.2, as well as for \Subject and \CoverDate from Section 2.3.4.

Also near the top of the file one finds front-matter content

```
%\title{%
%  {\huge \textit{The LATEX Live Guide---2015}}
%}
%\author{Karl Berry, editor \[\3mm]
%        \url{http://tug.org/texlive/}
%}
%\date{May 2015}
```

which supplies metadata information for the commands \Title, \Author, \CoverDisplayDate also from Section 2.3.4, and \CopyrightURL.

Most of the hundreds of thousands, if not millions of documents prepared using T_EX, L^AT_EX and other T_EX-based formats, include similar metadata information, much of which currently does not accompany the resulting PDF. It is becoming increasingly common, if not yet a legal requirement, for PDFs to satisfy a standard that requires inclusion of metadata. This is especially so for government agencies and institutions receiving government funding, in several countries around the world.

It is an aim of the pdfx to simplify the process of capturing and including metadata within L^AT_EX-produced PDFs, from both the author's view and that of archivists. The extra features introduced with version 1.5.8 take a large step in that direction. This includes the ability, described in the next subsection, to reliably include data presented in different text encodings, rather than being restricted to UTF-8 only. It is a role of the software to make the conversion, rather than rely on some 3rd party for a translation.

4.1. Multilingual Metadata

A cursory search of the documentation (.../texmf-dist/doc) subtree of the forthcoming T_EX Live 2016 release reveals more than 730 different .tex or .dtx document sources which specify an input encoding, via the \usepackage[...]{inputenc} command. Roughly 380 (a bit more than half) declare UTF-8 as the input encoding. Of the remainder there are ≈ 20 other encodings specified, covering a range of languages for at least part of their content. At some

⁵found at /usr/local/texlive/2016/texmf-dist/doc/texlive/texlive-en/.

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point in time, these documents may be required to have accurate accompanying metadata, as part of conformance to a designated PDF (or other) standard. There are libraries and archives that already must meet such standards.

We have shown above, in Section 2.2, how the `.xmldata` file can be inserted into the document source, which then ensures that metadata is reliably transferred along with the source itself. This seems a good strategy, but are there any problems with it, especially in a multilingual context?

Modern editing software can require an encoding to be associated with each file. This is what allows the correct characters to be shown, from what is otherwise just a sequence of 8-bit bytes. The flip-side is that arbitrary editing is not permitted. Add some UTF-8 data into a file that is encoded as Latin-2 then try to save it. You may be asked to specify a new encoding, or the application may even crash out entirely. Maybe this happens *accidentally*. It is not hard for a curly quote (') or endash (–) to be included; many editors have settings which can do this with normal ascii input. Turn *off* such settings.

The approach that we advocate is that when editing to add metadata, best is to:

1. use the *same encoding* as is specified for the file itself, if known (as is usually the case);
2. even if 1. is not possible, use Copy/Paste *within* the document source (e.g., for authors' names, addresses, affiliations, etc.) and from comments, as in Section 4 above;
3. avoid typing new characters, especially quotes and dashes, and be extra careful with back-spacing to preserve the real meaning of copied content.

Even if the original encoding is not known, use of Copy/Paste from other parts of the document is normally not going to change its encoding. This should not cause the file to become invalid due to mixed content. In some situations it may be necessary to use an ASCII-only representation, such as L^AT_EX's LICR⁶ macros [22, § 7.11].

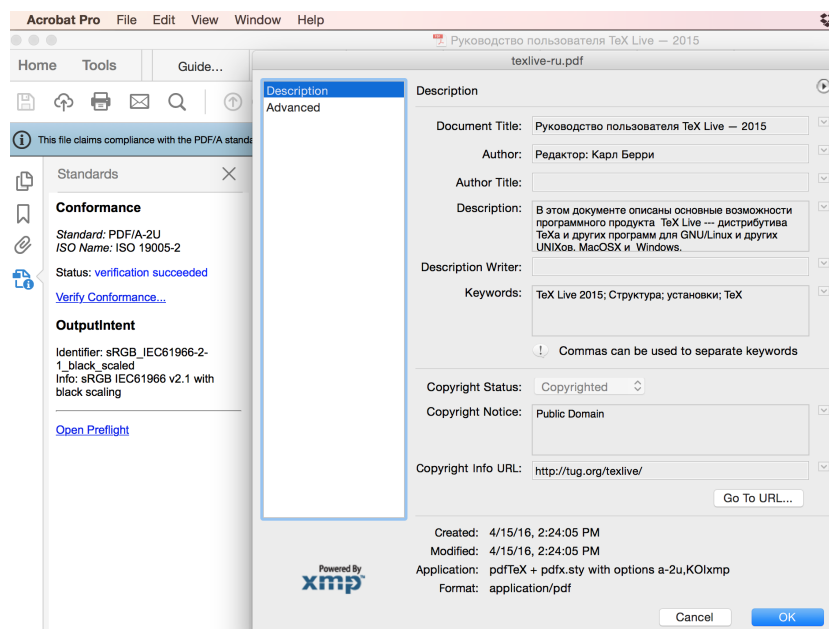


Figure 1: Metadata generated from the coding shown in Figure 2, viewed using Acrobat Pro's 'Additional Metadata ...' panel.

⁶LICR: L^AT_EX Internal Character Representation; or think 'I = Interchange'.


```
% $Id: texlive-ru.tex 34060 2014-05-16 19:52:41Z boris $
%
%\def\Status{1}
\providecommand{\pdfxopts}{a-2u,KOIxmp}
\providecommand{\thisyear}{2015}
%\immediate\write18{rm \jobname.xmpdata}%  uncomment for Unix-based systems
\begin{filecontents*}{\jobname.xmpdata}
\Title{\textKOI{òÕËÏËÏÄÓÔËÏ ðÏÏØÛÏÄÁÔÄÏÑ} TeX Live \textemdash \thisyear}
\Author{\textKOI{äÄÄÄËÖÏÖ: ëÄÒÏ äÄÖÖË}}
\Subject{\textKOI{æ ÜÖÏÏ ÄÏËÖÏÄÏÖÄ ÌðÉÓÄÏÜ ÍÓÏËÏÜÄ æÏÛÏÖÏÏÖÖË ðÖÏÇÖÁÍÏÏÇÏ ðÖÏÄÖËÖÄ }
TeX Live \textKOI{--- ÄÉÖÖÖÉÄÖÖËÉÁ }TeX\textKOI{Á É ÄÖÖÇËË ðÖÏÇÖÁÍÏ ÄÏÑ} GNU/Linux
\textKOI{É ÄÖÖÇËË }UNIX\textKOI{ÏË}, MacOSX\textKOI{ É Windows.}}
\Keywords{TeX Live \thisyear\sep \textKOI{óÔÔÖËÖÔÖÄ}\sep \textKOI{ÖÖÖÄÏÏËËË}\sep \TeX}
\CoverDisplayDate{\textKOI{íÁË} \thisyear}
\CoverDate{2015-05-06}
\Copyrighted{False}
\Copyright{Public Domain}
\CopyrightURL{http://tug.org/texlive/}
\Creator{pdfTeX + pdfx.sty with options \pdfxopts }
\end{filecontents*}
\documentclass{article}
\usepackage[\pdfxopts]{pdfx}[2016/03/09]
\PassOptionsToPackage{obeyspaces}{url}
\let\tldocrussian=1 % for live4ht.cfg
\usepackage{cmap}
\usepackage{tex-live}
\usepackage[koi8-r]{inputenc}
\usepackage[russian]{babel}
...
\begin{document}
\title{%
  {\huge \textit{òÕËÏËÏÄÓÔËÏ ðÏÏØÛÏÄÁÔÄÏÑ \protect\TL{} "--- \thisyear}}}%
}
\author{äÄÄÄËÖÏÖ: ëÄÒÏ äÄÖÖË\[\[3mm]
  \url{http://tug.org/texlive/}}
\date{íÁË \thisyear}
```

Figure 2: Example of cyrillics in metadata, shown as if T1-encoded. See Figure 1 for the actual result.

4.1.1. Metadata with Cyrillics

Here is a ‘real-world’ example, with Figure 1 showing the metadata as could be produced for the Russian language version of the T_EX Live documentation, from coding as shown in Figure 2. The source file itself is actually encoded for KOI8-R, as indicated by the presence of the code line `\usepackage[koi8-r]{inputenc}`, but is deliberately shown here encoded as T1 [22, p. 449]. This difference is immaterial for checking the validity of the metadata. For example, the stream of upper (accents, etc.) characters within `\Title{\textKOI{ ... }}` is the same as within `\title{... \textit{ ... }}`. Similarly for `\Author{\textKOI{ ... }}` and `\author{...}`, and `\CoverDate` and `\date`. Strings for the `\Subject` and `\Keywords` are taken from the first actual paragraph in the document, and from early subsection titles.

It is the ‘parser’ command/macro `\textKOI{ ... }` that indicates that the upper range characters (having byte codes 128–255) are to be treated as KOI8-R characters, rather than as part of UTF-8 byte sequences. It works by examining each byte in sequence, and returning the

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appropriate UTF-8 2-byte sequence for the required cyrillic character. This happens during the processing of data from `\jobname.xmpdata` for fleshing-out the XMP metadata packet to be included within the final PDF/A document.

The ‘parser’ macros defined for various encodings, are given in Figure 3. In Section 2.1.7 the package options are given for loading the appropriate support for desired languages or alphabets. Support for other encodings can be added, if there proves to be a need.

| macro | encodings | bytes 128–255 with languages |
|-------------------------|--|------------------------------|
| <code>\textLAT</code> | Latin-1 | Western European |
| <code>\textLII</code> | Latin-2 | Middle European |
| <code>\textLIII</code> | Latin-3 | South European |
| <code>\textLIV</code> | Latin-4 | North European |
| <code>\textLTV</code> | Latin-5 | Turkish |
| <code>\textLVI</code> | Latin-6 | Nordic |
| <code>\textLVII</code> | Latin-7 | Baltic Rim |
| <code>\textLIIIX</code> | Latin-8 | Celtic |
| <code>\textLIX</code> | Latin-9 | Western European, incl. € |
| <code>\textKOI</code> | KOI8-R, KOI8-RU | cyrillic alphabets |
| <code>\textLGR</code> | LGR, ISO-8859-7 | Greek & Polytonic Greek |
| <code>\textARM</code> | ArmT _E X, ArmSCII8 | Armenian |
| <code>\textHEB</code> | HE8, ISO-8859-8, CP1255 | Hebrew |
| <code>\textHEBO</code> | CP862 | Hebrew |
| <code>\(...\)</code> | parses simple mathematical expressions | |

Figure 3: Parser macros, defined for specific types of input.

```
(/usr/local/texlive/2014/texmf-dist/tex/latex/oberdiek/grfext.sty)
(/usr/local/texlive/2014/texmf-dist/tex/latex/latexconfig/epstopdf-sys.cfg)
> \LICRs=macro:
->\IeC {\CYRR} \IeC {\cyru} \IeC {\cyrk} \IeC {\cyro} \IeC {\cyrv} \IeC {\cyro}
\IeC {\cyrd} \IeC {\cyrs} \IeC {\cyrt} \IeC {\cyrv} \IeC {\cyro} \IeC {\cyrp}
\IeC {\cyro} \IeC {\cyrk} \IeC {\cyrstsn} \IeC {\cyrz} \IeC {\cyro} \IeC {\cyrp}
rv \IeC {\cyra} \IeC {\cyrt} \IeC {\cyre} \IeC {\cyrk} \IeC {\cyra} \IeC {\cyrp}
\TL {} "---- 2015.
\showLICRs ...otect \edef \LICRs {#1}\show \LICRs
1.45 ...???? ?????????? \protect\TL{} "---- 2015}
? █
43 \begin{document}
44
45 \showLICRs(Руководство пользователя \protect\TL{} "---- 2015)
46 \title{
47 \huge \textit{Руководство пользователя \protect\TL{} "---- 2015}}%
48 }
49
50 \author{Редактор: Карл Берри\3mm}
51 \url{http://tuo.ora/texlive/}
```

Figure 4: How to see LICRs in the .log window.

With encoded characters marked in this way with a ‘parser’ macro, it is actually possible to mix UTF-8 metadata with other bytes; provided, of course, you have an editor that allows such a file to be created and saved. On the other hand, if you are unhappy with mixing content having different encodings, then there is another way, based upon T_EX’s LICR macros [22, § 7.11] for representing accented and non-latin characters. These are normally hidden away (‘I = Internal’) but in fact can be seen within auxiliary files, such as `.aux` and `.toc`, `.lof` and `.lot`. This is how T_EX stores the knowledge of such characters for use in a part of the

document processing which may not have the same encoding as the document as a whole, or may require characters generated using several different encodings. Thus LICRs allow for a reliable representation passed to a different context; think ‘I = Interchange’.

```
% $Id: texlive-ru.tex 34060 2014-05-16 19:52:41Z boris $
%
%\def\Status{1}
\providecommand{\pdfxopts}{a-2u,KOIxmp}
\providecommand{\thisyear}{2015}
%\immediate\write18{rm \jobname.xmpdata}%  uncomment for Unix-based systems
\begin{filecontents*}{\jobname.xmpdata}
\Title{\IeC {\CYRR } \IeC {\cyru } \IeC {\cyrk } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyro }
\IeC {\cyrd } \IeC {\cyrS } \IeC {\cyrt } \IeC {\cyrv } \IeC {\cyro } \IeC {\cyrp } \IeC {\cyro }
\IeC {\cyrI } \IeC {\cyrSftsn } \IeC {\cyrz } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyra } \IeC {\cyrt }
\IeC {\cyre } \IeC {\cyrI } \IeC {\cyrya } TeX Live \textemdash \thisyear}
\Author{\IeC {\CYRR } \IeC {\cyre } \IeC {\cyrd } \IeC {\cyra } \IeC {\cyrk } \IeC {\cyrt }
\IeC {\cyro } \IeC {\cyrr } : \IeC {\CYRK } \IeC {\cyra } \IeC {\cyrr } \IeC {\cyrI }
\IeC {\CYRB } \IeC {\cyre } \IeC {\cyrr } \IeC {\cyrr } \IeC {\cyri } }
\Keywords{TeX Live \thisyear\sep \IeC {\CYRS } \IeC {\cyrt } \IeC {\cyrr } \IeC {\cyru }
\IeC {\cyrk } \IeC {\cyrt } \IeC {\cyru } \IeC {\cyrr } \IeC {\cyra } \sep \IeC {\cyru }
\IeC {\cyrS } \IeC {\cyrt } \IeC {\cyra } \IeC {\cyrn } \IeC {\cyro } \IeC {\cyrv } \IeC {\cyrk }
\IeC {\cyri } \sep \TeX}
\Subject{\IeC {\CYRV } \IeC {\cyrrrev } \IeC {\cyrt } \IeC {\cyro } \IeC {\cyrm } \IeC {\cyrd }
\IeC {\cyro } \IeC {\cyrk } \IeC {\cyru } ...
...
\CoverDisplayDate{\IeC {\CYRM } \IeC {\cyra } \IeC {\cyrishrt } 2015}
\CoverDate{2015-05-06}
\Copyrighted{False}
```

Figure 5: Example of cyrillics in metadata, using LICRs.

```
43 \begin{document}
44
45 \addcontentsline{toc}{title}{Руководство пользователя \protect\TL{} "---- 2015}
46 \title{\%
47 {\huge \textit{Руководство пользователя \protect\TL{} "---- 2015}}}%
48 }
49 \addcontentsline{toc}{author}{Редактор: Карл Берри}
50 \author{Редактор: Карл Берри\{3mm}
51 \url{http://tug.org/texlive/}
52 \date{Май \thisyear}
53 \addcontentsline{toc}{date}{Май \thisyear}
54 \addcontentsline{toc}{docs}{Структура}
55 \addcontentsline{toc}{install}{установки}
56 \addcontentsline{toc}{Subject}{В этом документе описаны основные возможности программного продукта
57 \TL{} "---- дистрибутива \TeX{}а и других программ для \acro{GNU}/Linux и других UNIXов, \MacOSX и Windows.}
58 \maketitle
59
```

Figure 6: How to get desired LICRs into the .toc file.

Figure 4 shows how to see this. The document source in the lower portion clearly shows the cyrillic input, whereas the .log messages in a command-line window above reveal the LICR representation. A command `\showLICRs` is available with pdfx.sty version 1.5.8, specifically to allow this. Now the LICR representation can be copied directly from the .log file, modulo slight difficulties due to the way long lines are broken. As this representation is entirely with ASCII characters, it should not cause any conflict with any UTF-8 metadata that you want within the same file. The .xmpdata file might now look as in Figure 5. Although very verbose,

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this should be resistant to any corruption due to character encodings, and produces the same result within the PDF, as in Figure 1.

Alternatively one can exploit the `.toc` file, using T_EX’s command `\addtocontents`, as shown in Figure 6. After processing the file, you can copy the LICR representations out of the `.toc` file, taking care to remove anything of a non-character nature (e.g., implementing the size and spacing of the letters in T_EX).

Of course once you have harvested the metadata in this format, remove or comment-out those extra `\showLICRs` to get uninterrupted processing. Similarly comment-out the extra `\addtocontents` lines, else the real Table-of-Contents will become corrupted with unwanted entries. A couple more T_EX processing runs should restore the PDF to the way you want it.

4.1.2. Metadata with Polish

The next example has upper-range bytes intended to represent Latin-2 encoded characters, as used in Polish. With the T_EX source starting as in Figure 8, the resulting metadata is shown in Figure 7.

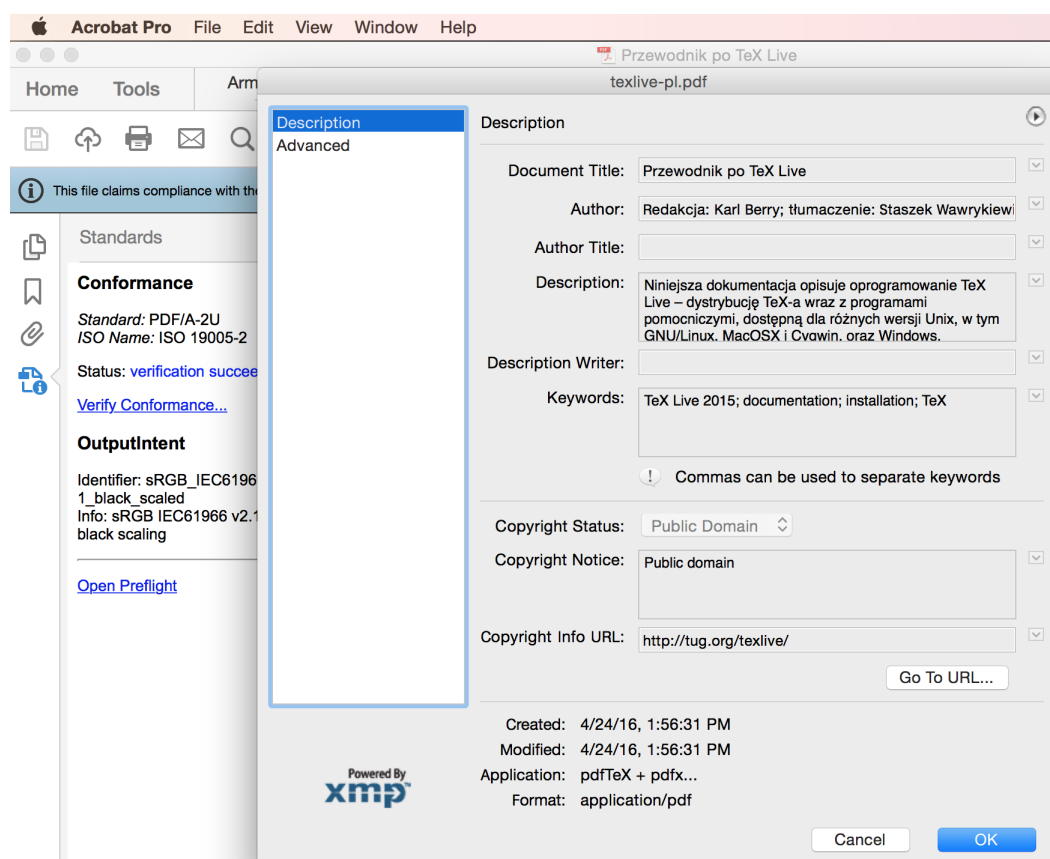


Figure 7: Metadata generated from the coding shown in Figure 8 for the Polish version of T_EX Live 2015 documentation, showing Latin-2 encoded characters. The document is valid for PDF/A-2, after having been processed with pdfT_EX.

Here the ‘parser macro’ is `\textLII`, which can be seen in Figure 8 to surround either complete metadata entries, or just those parts containing polish accented (or other) characters in entries that also contain english words. The macro `\textLF` provides a line-feed character for the UTF-8 output.

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```
% iso8859-2
% $Id: texlive-pl.tex, v. 53 2015/05/17
% TeX Live documentation.
% Originally written by Sebastian Rahtz and Michel Goossens,
% now maintained by Karl Berry and others.
% Polish translation and additions by Staszek Wawrykiewicz
% (with a little help from my friends, while my guitar gently weeps ;-))
% Public domain.
% ----
% UWAGA dla recenzentów/tłumaczy: %! to moje komentarze (StaW)
%
\providecommand{\pdfxopts}{a-2u,LATxmp}
\providecommand{\thisyear}{2015}
\begin{filecontents*}{\jobname.xmpdata}
\Title{Przewodnik po TeX Live \thisyear}
\Author{Redakcja: Karl Berry\sep \textLII{tłumaczenie: Staszek Wawrykiewicz}}
\Subject{\textLII{Niniejsza dokumentacja opisuje oprogramowanie \TeX\ Live
-- dystrybucję \TeX-a wraz z~programami pomocniczymi, dostępna dla różnych wersji Unix,
w~tym GNU/Linux, MacOSX i~Cygwin, oraz Windows.}\textLF\textLF Documentation originally
written by Sebastian Rahtz and Michel Goossens, now maintained by Karl Berry and others.}
\Keywords{TeX Live \thisyear\sep documentation\sep installation\sep \TeX}
\Copyright{Public domain}\Copyrighted{False}
\CopyrightURL{http://tug.org/texlive/}
\CoverDisplayDate{Maj \thisyear}
\CoverDate{\thisyear-05-17}
\Creator{pdfTeX + pdfx.sty with options \pdfxopts, from TeX Live 2016}
\end{filecontents*}
%
\documentclass{article}
\let\tldocenglish=0 % for live4ht.cfg
\let\textsl\textit
\usepackage[\pdfxopts]{pdfx}[2016/04/13]
\PassOptionsToPackage{obeyspaces}{url}
\PassOptionsToPackage{breaklinks,colorlinks,linkcolor=hypercolor,citecolor=hypercolor,%
urlcolor=hypercolor,filecolor=hypercolor,bookmarksopen,hyperindex}{hyperref}
\hypersetup{breaklinks,colorlinks,allcolors=hypercolor}
\usepackage{tex-live}
\usepackage{polski} % for PL
\usepackage[latin2]{inputenc} % for PL
\usepackage[T1]{fontenc}
...
\begin{document}
\title{\huge \textit{Przewodnik po \protect\TL{}} 2015}}
\author{Redakcja: Karl Berry; tłumaczenie: Staszek Wawrykiewicz \ll[3mm]
\url{http://tug.org/texlive/}}
\date{Maj 2015}
```

Figure 8: Start of the \TeX source for the Polish version of \TeX Live documentation. Although Latin-2 encoded, the bytes are shown here using \TeX ’s T1 encoding [22, p. 449].

As a technical note, the `\jobname.xmpdata` file is read with `\obeyspaces` in effect. This causes space runs in the input to be replaced by a single ‘active space’ character, which ultimately expands into a normal space upon output. This is needed to preserve inter-word spaces, which would otherwise get lost during parsing, due to \TeX ’s pattern matching when reading

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macro arguments. Each byte is examined individually, with normal letters a–zA–Z and most punctuation characters passed through unchanged.

Let’s understand better how this example was created. There are three files involved.

- `pdfx.dtx`, the source for this documentation, open in an editor with encoding declared as UTF-8;
- `texlive-pl.tex` the Polish documentation for T_EX Live, open in the same editor with Latin-2 encoding;
- `latin2-example.tex` which starts life as an empty file on disk.

This latter file must be opened in the editor, with encoding declared as Latin-2 (ISO-8859-2). Next the preamble is copied from `texlive-pl.tex` and pasted into `latin2-example.tex` which is then saved to disk. Further editing is done to `latin2-example.tex` to add verbatim markers (`|...|`) and adjust line lengths for display within Figure 8. This file’s contents is included as part of the documentation via `\input{latin2-example}` within an environment that handles presentation aspects, and (since 2018) declares `\UseRawInputEncoding`.

What *cannot* be done is to paste the preamble content directly into `pdfx.dtx`. Consider what would then happen, using ‘`thumaczy`’ (‘translators’, on line 10 following ‘UWAGA’). This word shows correctly in the Latin-2 encoded files. It was typeset here using `\l` for the ‘l’ letter, having Unicode code-point `Ux0142` (so UTF-8 byte pair “C5”82). However, it occurs at slot “B3 within Latin-2 encoding. In the T1 font encoding [22, p. 449] the character glyph name for slot “B3 is `/scedilla`, which is what shows in Figure 8. When the ‘l’ is pasted directly into a UTF-8 file and shown verbatim, the result is the pair of glyphs “C5 (`/Aring`) and “82 (`/Cacute`); viz. `tÂCumaczy`.

As with Figure 2 it is not important that the correct characters are shown here, but that the metadata in `\jobname.xmpdata` corresponds to what is used on the titlepage of the PDF; e.g., the contents of `\Title` and `\title`, `\Author` and `\author`, etc.

4.1.3. Metadata with Greek

Prior to proper support for UTF-8 input, a method for preparing document source for the modern Greek language (and also for polytonic Greek), involved the use of LGR encoded fonts. Such a font has Greek (instead of Latin) letters in the slots for a–zA–Z, see [22, §9.4.2]. Thus ordinary ASCII letters are used to produce the Greek characters; the mapping of ASCII to Greek is referred to as a ‘transliteration’ scheme. It serves as *both* an input encoding, and as a font encoding. Accents and diacritic marks are provided through ligatures built-in to the fonts. Various documents can be found on the web⁷ and within T_EX Live distributions⁸.

Indeed the current maintainer Günther Milde states “The LGR transliteration does not work for PDF metadata”. This is because there is no translation of LGR input into T_EX LICRs, as happens with say `\usepackage[utf8]{inputenc}` for UTF-8 input, or when upper 8-bit characters are present using `\usepackage[iso-8859-7]{inputenc}`. With these, LICRs such as `\textAlpha`, `\textOmicron`, ..., `\textomega` are produced, which result in the correct characters for metadata and bookmarks, perhaps employing Unicode ‘combining’ characters for accented letters. Using `pdfx` the UTF-8 characters can be put directly into the `.xmpdata` file; LICRs are interpreted provided the `grxmp` loading option has been specified.

Using the methods of `pdfx` the metadata difficulty is remedied, as can be seen in Figure 9 using coding as shown in Figure 10. This requires the `LGRxmp` option and `\textLGR` ‘parser’ macro. The original document source, called `usage.tex`, can be found in the directory specified in the footnote below. As this document is essentially an English description of how to use LGR for Greek, we have used the ‘Keywords’ field to provide examples of such usage. Since

⁷e.g., <http://milde.users.sourceforge.net/LGR/>

⁸TeXLive: `.../2016/texmf-dist/doc/generic/babel-greek/`

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a macro `\textgreek` can be used for greek portions within such documents, this macro name is aliased to `\textLGR` within the context where metadata is processed. Furthermore, parsing using `\textLGR` generates correct pre-composed characters for letters with accents or diacritics. Bookmarks can also be generated from LGR input, using a technique described in Section 4.1.4.

The features available with different loading options are summarised here.

- no option: all metadata in `.xmpdata` file is in UTF-8 (incl. ASCII)
- `grkxmp`: LICRs can be present; e.g. `\textAlpha`, `\textOmega`, etc.
- `LGRxmp`: supports LGR-encoded input and ISO-8859-7 upper range characters, using the `\textLGR` ‘parser’ macro.

With `LGRxmp` specified, the features of `grkxmp` are also available; so any lower-listed option allows data to be mixed with that for higher-listed ones.

The final piece to get validation for PDF/A from LGR input, is to specify a Unicode point for the ‘v’ used only in the strong ‘sv’ ligature to obtain a non-final ‘sigma’ typeset in isolation.

```
\pdfglyphtounicode{internalchar2}{200D}
```

This gives an interpretation as ‘zero-width joiner’. There are two instances of this within `usage.tex`. Copy/Paste works as desired. Using pdfTeX the above command is done automatically. Drivers, such as XeTeX lacking an implementation of `\pdfglyphtounicode`, can fail to produce a valid PDF due to this rather minor deficiency.

Greek numerals, using `\greeknumeral` or `\Greeknumeral` cannot work directly within a `.xmpdata` file. However if such is desired, the following technique allows correct LICRs to be

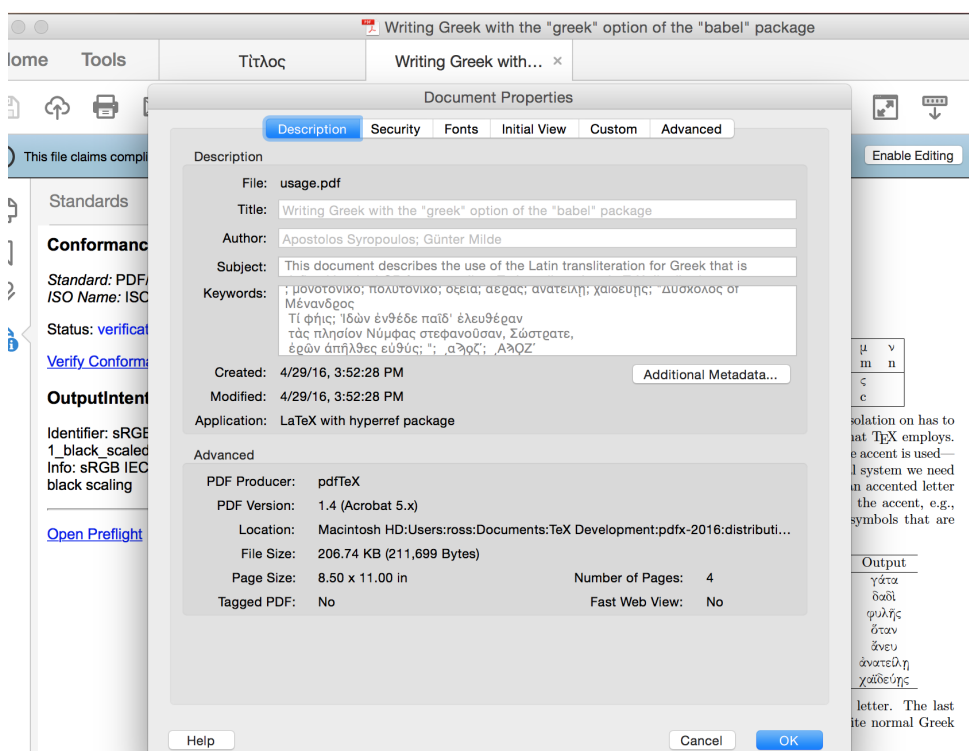


Figure 9: Metadata generated from the coding shown in Figure 10 using the greek language specified via the LGR encoding.

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
% ...
% This file is part of the Babel system.
% -----
%
% It may be distributed and/or modified under the
% conditions of the LaTeX Project Public License, either version 1.3
% ...
% The Current Maintainer of this work is Günter Milde.
% ...

\providecommand{\pdfxopts}{a-2u,LGRxmp,LATxmp}
\begin{filecontents*}{\jobname.xmpdata}
\Title{Writing Greek with the "greek" option of the "babel" package}
\Author{Apostolos Syropoulos\sep Günter Milde}
\Subject{This document describes the use of the Latin transliteration for Greek that is
defined by the LGR font encoding. Today, all modern LaTeX distributions support literal
input of Greek, which is the preferred method for new documents. [G. Milde 2013/12/02]}
\Keywords{\textLGR{monotonik'o}\sep \textLGR{polutonik'o}\sep \textgreek{oxe'ia} \sep
\textgreek{>a'erac}\sep \textgreek{>anate'ilh|}\sep \textgreek{qa'ide'uh|c}} \sep
\textgreek{D'uskoloc} of \textgreek{M'enandroc}\textLF \textLGR{T'i f'hic? <Id'wn
>enj'ede pa'id'' >eleuj'eran\textLF t'ac plhs'ion N'umfac stefano~usan, S'wstrate,
\textLF >er~wn 'ap~hljec e>uj'uc? \sep
\textaristerikeraia\textalpha\textsampi\textqoppa\textzeta\textdexiakeraia\sep
\textaristerikeraia\textAlpha\textSampi\textQoppa\textZeta\textdexiakeraia}}
\CoverDate{1997-10-15}
\CoverDisplayDate{October 15, 1997}
\Copyright{This file is part of the Babel system.\textLF This file may be distributed and/or
modified under the conditions of the LaTeX Project Public License, either version 1.3
of this license or (at your option) any later version.}
\CopyrightURL{http://www.latex-project.org/lppl.txt}
\end{filecontents*}
%
\documentclass[11pt]{article}
\usepackage[\pdfxopts]{pdfx}[2016/04/13]
\hypersetup{colorlinks,allcolors=blue}
\usepackage[american,greek]{babel}
\languageattribute{greek}{polutoniko}
\usepackage{athnum,grmath}
\newcommand{\sg}{\selectlanguage{greek}}
\newcommand{\sa}{\selectlanguage{american}}
\begin{document}
\selectlanguage{american}
\title{Writing Greek with the \ttfamily greek\rmfamily\ option of the
\ttfamily babel\rmfamily\ package}
\author{Apostolos Syropoulos\
...\\...}
\date{October 15, 1997}
\maketitle
\abstract{\noindent
This document describes the use of the Latin transliteration for Greek that
is defined by the LGR font encoding. Today, all modern LaTeX distributions
support literal input of Greek, which is the preferred method for new
documents. [G. Milde 2013/12/02]}
```

Figure 10: Start of enriched L^AT_EX source for a document describing how to typeset in Greek, with added metadata demonstrating the LGR transliteration encoding.

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found for use in the metadata. At any convenient place within the \LaTeX source; e.g., near where the required number is used, insert coding such as:

```
{\pdfxGreeknumeralsHack \textgreek{\edef\num{\greeknumeral{1997}}\show\num}}%
```

Upon processing, the following will be written to the console or .log-window.

```
> \num=macro:
->\LGR\textaristerikeraia \LGR\textalpha \LGR\textsampi \let \protect \LGR\text
dexiakeraia \LGR\textqoppa \let \protect \LGR\textdexiakeraia \LGR\textzeta \le
t \protect \LGR\textdexiakeraia \protect \LGR\textdexiakeraia .
<argument> ...um {\greeknumeral {1997}}\show \num

1.90 ...k{\edef\num{\greeknumeral{1997}}\show\num}
}
```

from which the desired string of LICRs, is extracted; viz.

```
\textaristerikeraia\textalpha\textsampi\textqoppa\textzeta\textdexiakeraia
```

The corresponding trick does not work with \LaTeX , but the uppercasing can be done manually from the string obtained using \LaTeX ,

```
\textaristerikeraia\textAlpha\textSampi\textQoppa\textZeta\textdexiakeraia
```

leaving the initial and final \LaTeX macros as all lowercase. For smooth processing, remove or comment-out the added line after collecting the LICRs.

4.1.4. Metadata with Armenian

The \LaTeX package⁹ provides the method to typeset Armenian, with input being specified in various ways including a transliteration scheme from ASCII input. This transliteration is directed at the use of the OT6 encoding, developed for this purpose. Each way is supported by pdfx.sty with appropriate loading options, similar to the support for Greek (see Section 4.1.3).

- no option: all metadata in .xmpdata file is in UTF-8 (incl. ASCII)
- armxmp: using LICR-like macro names; e.g. \armAbyb, \armsha, \armfe etc.
- AR8xmp: using the \LaTeX (OT6) transliteration scheme or with upper-range characters in ArmSCII8 encoding, using the ‘parser’ macro \textARM.

There are 39 letters in the Armenian alphabet, so the transliteration includes many 2-letter combinations to specify the desired character. Whereas Greek uses punctuation symbols to specify diacritics, Armenian requires either ligatures implemented in the OT6-encoded font, or careful parsing of the input into LICR-like macros. \LaTeX source¹⁰ for the \LaTeX documentation is available in both English and Armenian. Figure 11 shows the result of enriching the Armenian version with relevant metadata, using coding as shown in Figure 12.

As in earlier examples, that metadata has come from the extensive comments at the head of the \LaTeX source file (represented by ... in Figure 12), and other title-page material, such as title and author names in both English and Armenian. Within the keywords are armenian words that are mentioned in the documentation as being slightly tricky to represent in transliteration, to verify that the required tricks have been correctly implemented.

⁹documentation: TeXLive: .../2016/texmf-dist/doc/generic/armenian/

¹⁰TeXLive: .../2016/texmf-dist/doc/generic/armenian/examples/latex/

Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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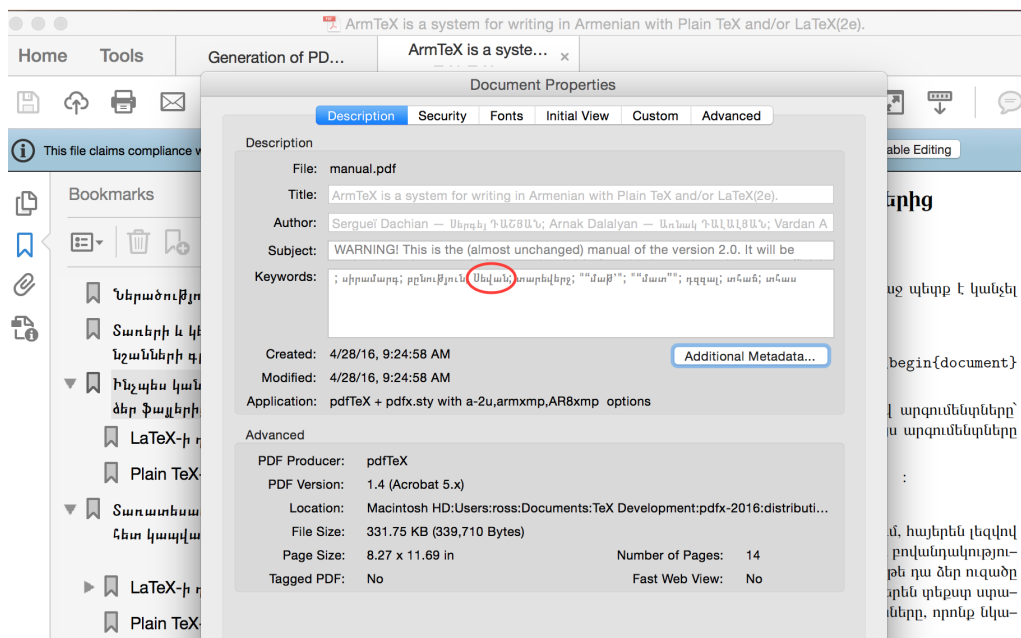


Figure 11: Metadata generated from the coding shown in Figure 12 using the Armenian language specified using ArmTeX transliteration. Bookmarks have been generated in Armenian. Figure 13 explains how the word indicated in red is obtained via parsing.

Also apparent in Figure 11 is the use of Armenian letters in the Bookmarks pane, having been generated from the transliteration source. This requires a 3-step process, as follows.

1. conversion of transliterated source into UTF-8. This is done as the .xmpdata file is processed, using \pdfxEnableCommands to make global definitions; e.g,

```
\xdef\ssectAtitle{\textARM{Nerac'uthyun}}
```

capturing the section title in the form supplied in the \TeX source. This can be seen in Figure 12, near the end of the `{filecontents*}` environment, and at the bottom where the `\section` command would occur.

2. conversion of the UTF-8 representation into UTF16-be, suitable for bookmark strings within the PDF file. With pdfTeX this is done using \StringEncodingConvert from Heiko Oberdiek's `stringenc.sty` package. LuaTeX and XeTeX can use the UTF-8 representation directly.
3. integration of the UTF16-be string (pdfTeX) or UTF-8 string (LuaTeX and XeTeX) into the coding that would normally generate the bookmark from a provided section title, in transliterated form.

These last two steps are combined into a single command, to replace the usual command for a section title; `\section`, `\subsection`, etc.

```
\pdfxBookmark{\section}{\ssectAtitle}{Nerac'uthyun}
```

Now `\pdfxBookmark` first checks that the macro passed as the 2nd argument actually exists. If it does not, an error message is given and upon continuation would just do `\section{Nerac'uthyun}` as normal. When it does exist, then step 2 is done (by pdfTeX) storing the result as `\pdfx@temp`.

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thê Thành, Ross Moore and Peter Selinger

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```
%%
%%
%% This is the 'manual.tex' file (ArmTeX manual in Armenian).
...
%%
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
\providecommand{\pdfxopts}{a-2u,armxmp,AR8xmp}
\immediate\write18{rm \jobname.xmpdata}
\begin{filecontents*}{\jobname.xmpdata}
\Title{ArmTeX is a system for writing in Armenian with Plain TeX and/or LaTeX(2e).\textLF
\textARM{\textARM{\aroff\TeX}-um ev {\aroff\LaTeX}-um Hayeren Lezvov Grelu Hamakarg}}
\Author{Sergue\i Dachian \textARM{--- Sergey DASHYAN}\sep Arnak Dalalyan
\textARM{--- Ar'nak DALALYAN}\sep Vardan Akopian \textARM{--- Vardan HAKOBYAN}}
\Copyright{\textcopyright 1997\textendash 2013 ArmTeX may be distributed and/or modified
under the conditions of the LaTeX Project Public License, either version 1.3 of this
license or (at your option) any later version.}
\CopyrightURL{http://www.latex-project.org/lppl.txt}
\Subject{WARNING! This is the (almost unchanged) manual of the version 2.0. It will be
replaced by the manual of the version 3.0 before this beta release becomes official.
A (temporary) brief description of the new features of \latArmTeX~3.0 can be found at
the end of the ``readme.txt'' file. \textLF
\textLF\textARM{OWSHADROWT'YO|WN: Sa tarberak 2.0-i (grethe anphophox) dzer'narkn e': Ayn
kphoxarinv tarberak 3.0-i dzer'narkov naxqan ays beta tho\ghark\man pashtonakanacowmu':
\ArmTeX~3.0-i nor hnaravoruthyunneri (g'a\ma\na\ka\vor) hamar'ot nkaragrowmu' (angleren
levzov) karogh eq gu'tarmuh nel``}\readme.txt\textARM{'' fayli verjum;}
\textLF\textLF\textARM{Hamakargu' o'gtagorc'elu hamar bavakan e' karoghanal ayn kanchel dzer
fayleric, tirapetel tar'qatesakneru' phoxogh hramannerin ev i\ma\nal the inchpes petq e'
nermuc'el teqstu' steghnasharic: Ays gor\c'o\ghu\thyun\ne\ru' nkaragrvac' en hajordogh
ereq bag'innerum:}}
\Keywords{\textARM{si\ra\marg}\sep \textARM{bu'armuh nuthyun}\sep \textARM{Se'armuh van}
\sep \textARM{tare\*verj}\sep \textARM{'mat''}\sep \textARM{'mat''}\sep \textARM{d\*zzal}
\sep \textARM{t\*haj'}\sep \textARM{t\*has}}
\CoverDisplayDate{1 June 1999 (\textARM{1-u' hunisi 1999 th.})}
\Creator{pdfTeX + pdfx.sty with \pdfxopts\space options}
\pdfxEnableCommands{\let\sl\empty%
\def\sectAtitle{\textARM{Nerac'uthyun}}%
\def\sectBtitle{\textARM{Tar'eri ev ketadrakan nshanneri greldazevu'}}%
...
\def\sectFtitle{\textARM{ArmTeX-i phophoxman patmuthyunu'}}%
}
\end{filecontents*}

\documentclass[12pt,a4paper]{article}
\usepackage[\pdfxopts]{pdfx}
\hypersetup{colorlinks,allcolors=blue}
...
\title{\ArmTeX$, \$\aroff \TeX}-um ev {\aroff \LaTeX}-um Hayeren Lezvov
Grelu Hamakarg\ \ {\normalsize\aroff (\latArmTeX: a System for Writing in Armenian
with \TeX\ and \LaTeX)}}
\author{...}%
\date{1-u' hunisi 1999 th.}
...
\begin{document}
\maketitle
...
%\section{\sectAtitle}%{Nerac'uthyun}
\pdfxBookmark{\section}{\sectAtitle}{Nerac'uthyun}
```

Figure 12: Enriched \LaTeX source for the Armenian version of the Arm \TeX manual, with added metadata demonstrating the Arm \TeX transliteration scheme for OT6 encoding. Also shown is coding used to produce bookmarks from the transliteration.

With Lua \TeX and Xe \TeX , `\pdfx@temp` stores a copy of the UTF-8 data. Then the commands needing to be executed are essentially

```
\pdfstringdefDisableCommands{\let\sectAtitle\pdfx@temp}
\def\sectAtitle{Nerac'uthyun}
\section{\sectAtitle}
```

so that the correct section heading is displayed on the page, but when `\sectAtitle` is processed to create a bookmark it is replaced by the pre-prepared contents of `\pdfx@temp`. There are some technicalities¹¹ to make this work cleanly, as just doing these commands would interfere with other uses of `\pdfstringdef`. In case a long sectioning command has an optional argument, or a `*`-variant is needed, then include it this way.

```
\pdfxBookmark[Ar'avot e'r]{\section*{\sectAtitle}{Ar'avot e'r, Araratyan dashti ...}}
```

4.1.5. Other Languages

There is support for Metadata using characters from other languages, with corresponding loading options, as follows.

- `arbxmp`: Arabic; via LICRs `\textarabicallef`, `\textarabicqaf`, `\textarabicalleflowerhamza`, etc.
- `devxmp`: Devanagari; via LICRs `\textdevanagaria`, `\textdevanagarivocalicr`, `\textdevanagaricandrabindu`, etc.
- `hebxmp`: Hebrew; via LICRs `\hebalef`, `\hebsamekh`, `\hebfinalpe` and accent marks `\segol`, `\qubuts`, etc.
- `vnmxmp`: Vietnamese; via LICRs `\ABREVE`, `\OCIRCUMFLEX`, `\uhorn` etc. and the combinations of multiple accents applied as usual via `\'`, `\``, `\^`, etc.

The LICRs include support mapping accented letters to precomposed glyphs, falling back on ‘combining characters’ only in unusual situations. Special input conventions or methods, such as transliteration schemes, are *not yet* supported. Indeed, these options are largely untested, so any difficulties encountered should be reported to the package authors. Requests to support extra input methods or other language blocks should also be directed to the authors, along with pointers to where the desired input methods are fully described. Sample ‘real-world’ documents would be greatly appreciated.

4.2. L8U pseudo-encoding

To understand how pdfx handles the translation into UTF-8 of input that is not already in that format, we’ll briefly discuss T_EX’s font-encoding mechanism, which is the basis for LICR macros [22, § 7.11]. As an example, consider the macro `\textgamma` representing the lowercase Greek letter γ . Various T_EX packages declare this as LICR in different ways, for different purposes.

```
greek-fontenc/lgrenc.def:\DeclareTextSymbol{\textgamma}{LGR}{103}
tipa/t3enc.def:\DeclareTextSymbol{\textgamma}{T3}{71} % Gamma
greek-fontenc/greek-euenc.def:\DeclareTextCommand{\textgamma}{\LastDeclaredEncoding}{Î1}
hyperref/puenc.def:\DeclareTextCommand{\textgamma}{PU}{\83\263}%* U+03B3
ucs/data/uni-2.def:\uc@dc1c{611}{tipa}{\textgamma}%
ucs/data/uni-3.def:\uc@dc1c{947}{default}{\textgamma}%
```

Here the `\uc@dc1c` commands associate UTF-8 input of `Ux0263` (IPA small letter gamma) and `Ux03B3` (Greek small letter gamma) internally with `\textgamma`, whereas the others deal with

¹¹In fact a small change is made to how `\@writetorep` is used.

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output formats¹². In four of these examples there is a number, which refers to a position in an ‘encoding vector’ for the particular font used to place the character onto the printable page. For example LGR refers to greek fonts, encoded as explained in Section 4.1.3. IPA phonetics use the T3 encoding, so `\textgamma` refers to a character from a different Unicode block.

With two of these cases there is no specific font. For example, PU is used to create book-mark strings, and other PDF string inclusions, using `\pdfstringdef` from the `hyperref` package. With `greek-euenc.def` designed for XeT_EX and LuaT_EX, the encoding can be variable, with the output bytes being those for the UTF-8 encoding of γ , namely `^^ce^b3`, shown here as the T1-encoded pair `îï`. The term ‘pseudo-encoding’ has been coined by the T_EX team. Although there is no actual font to determine the encoding, to an author there is essentially no difference in how corresponding macros can be used to get a character placed into an appropriate structure within the PDF.

Thus there are 4 output forms for this character, and we’ve not even considered how γ is used in mathematics! To handle these concurrently, one has internally-defined control-sequence names

```
\LGR\textgamma=\char"67      where  $6 \times 16 + 7 = 103$ 
\T3\textgamma=\char"47       where  $4 \times 16 + 7 = 71$ 
\PU\textgamma=\long macro:->\83\263
\L8U\textgamma=\long macro:->îï
```

where the 2nd ‘\’ is part of the name¹³. The latter macro is explained below. To use the specific version of the macro, T_EX maintains a ‘font-encoding’ parameter, set using `\fontencoding{...}` local to the surrounding environment grouping.

To the above declarations of `\textgamma`, to deal with conversion to UTF-8, the pdfx package adds the following declarations when the LGRxmp option is used.

```
pdfx/l8ugrk.def:\DeclareTextCommand{\textgamma}{L8U}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{\textgamma}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{g}{îï}
pdfx/l8ugrk.def:\DeclareTextCompositeCommand{\textLGRenc}{L8U}{^e3}{îï}
```

The pseudo-encoding name L8U indicates Local conversion into UTF-8 Unicode, as required for metadata, using pdfx.sty. Currently this pseudo-encoding is used in one place only; during the interpretation of information supplied through the `\jobname.xmpdata` file. This happens as part of the pdfx package, *before* it uses `xmpincl.sty`. Such specificity justifies being called a ‘Local’ encoding. However, other tasks may emerge requiring on-the-fly conversion to UTF-8. In this case all the functionality of this pseudo-encoding could be shifted into a separate package, and the name changed to reflect this more general usage. Bookmarks from transliterated input, as described in Section 4.1.4, is possibly a sufficient reason to have a separate package. Another possibility is to generate on-the-fly creation of UTF-8 strings, to be sent to XeT_EX or LuaT_EX running as a slave process to generate images of string using OTF fonts, which pdfT_EX currently cannot handle. The result would then be imported back into the running job as an image. The authors invite suggestions of how this L8U pseudo-encoding functionality can be put to good use.

Accented letters normally use (e.g., from `t1enc.def`)

```
\DeclareTextComposite{\`}{T1}{A}{192}
```

to get the pre-composed ‘À’, rather than a composite built from ‘ and ‘A’. The last parameter

¹²Whereas `ucs.sty` handles UTF-8 input, mapping it to LICRs, with pdfx.sty we need the reverse mapping into UTF-8, not just from LICRs but also from legacy 8-bit encodings and transliteration schemes.

¹³obtained using `\csname LGR\string\textgamma\endcsname`.

is an index into a font; however the `\DeclareTextCompositeCommand` variant allows arbitrary coding as that final parameter, so can be the bytes for the UTF-8 representation of a character. In the above code lines, macros are defined as follows

```

\l8U\textLGRenc-\textgamma=macro:->{\i}
\l8U\textLGRenc-g=macro:->{\i}
\l8U\textLGRenc-ã=macro:->{\i}

```

where now the 2nd and 3rd (and perhaps 4th) ‘\’ are part of the name¹⁴. This shows how the ascii letter ‘g’ is associated with the UTF-8 bytes for γ , and how the upper 8-bit character from ^e3 can be similarly associated, as in ISO-8859-7 encoding.

All these associations come together in the ‘parser’ macro `\textLGR` which works as follows. Firstly, `\textLGR` is declared for L8U pseudo-encoding only, where it expands as follows.

```

\l8U\textLGR #1->\textgreekLGRstring {#1}
\l8U\textgreekLGRstring #1->\textgreekLGR@ii #1\@empty \@empty
\textgreekLGR@ii #1#2\@empty -> ... coding to test what is in #2
... \textLGRenc{#1}\@empty if #2 is \@empty
... \textLGRenc{#1}\textgreekLGR@i #2\@empty if #2 has more tokens
\textgreekLGR@i #1->\textgreekLGR@ii #1

```

Thus `\textLGRenc` is called on each token in the argument of `\textLGR`. Now `\textLGRenc`, which is applicable only when L8U pseudo-encoding is in effect, has a default expansion of just passing the character through unchanged; viz.

```

\DeclareTextCommand{\textLGRenc}{L8U}[1]{#1}

```

but by using `\DeclareTextCompositeCommand{\textLGRenc}{L8U}{...}{...}`, alternate expansions apply with specific arguments, as shown above. In particular, that final argument can include coding that ‘looks ahead’ to find the next character. This is used, for example, with diacritics in Greek, multi-letter sequences for Armenian letters, and other special cases related to ligatures and punctuation symbols. To illustrate this Figure 13 (below) follows the conversion of a specific word, given in the transliteration for Armenian (see Section 4.1.4). This conversion occurs using only T_EX’s macro-expansion ability. Some details relevant to this example are explained there.

Note how in Figure 13 the ArmT_EX user macro `\armuh` gets aliased to an LICR called `\textarmuh`. Since `\armuh` is already defined, not as an LICR, it cannot be declared to be one without creating problems. Instead, within the environment grouping where L8U pseudo-encoding is specified, one uses `\let\armuh\textarmuh` within a ‘rebinding’ macro command `\LIIXUmaparmenianletters`¹⁵ to get LICR functionality from user-commands.

```

\def\LIIXUmaparmenianletters{%
  \let\ArmTeX\textArmTeX
  \let\Armayb\textArmayb
  ...
  \let\armuh\textarmuh
  ...
  \def\armbf{}%
  ... }

```

As well as rebinding each command for a letter, the font style-switching commands are aliased to do nothing, as these are not relevant to creating UTF-8 output. Being localised by the L8U

¹⁴obtained using `\csname\string\LGR\string\textLGRenc-\string\textgamma\endcsname`.

¹⁵The start of the macro name is derived from pseudo-Roman numerals: IX = 9, IIX = 8

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```
\textARM{Se\armuh van}
\textarmenARMstring {Se\armuh van}
\textarmenARM@ii Se\armuh van\@empty \@empty
\textARMenc {S}\textarmenARM@i e\armuh van\@empty \@empty
\arm@en{S}{\Œ}{\arm@enc{h}{\Œ}{\arm@enc{H}{\Œ}{\Œ}}}\textarmenARM@i e\armuh van\@empty ...
\arm@enc{h}{\Œ}{\arm@enc{H}{\Œ}{\Œ}}\textarmenARM@i e\armuh van\@empty \@empty
\arm@enc{H}{\Œ}{\Œ}\textarmenARM@i e\armuh van\@empty \@empty
Œ?\textarmenARM@i e\armuh van\@empty \@empty
Œ?\textARMenc {e}\textarmenARM@i \armuh van\@empty \@empty
Œ?\textARMenc {e}\textarmenARM@i \armuh van\@empty \@empty
Œ?\arm@en{e}{\Œ,,}\arm@enc{'}{\ŒS}\arm@enc{v}{\Œ}{\Œ,,}}\textarmenARM@i \armuh van\@empty ...
Œ?\arm@enc{'}{\ŒS}\arm@enc{v}{\Œ}{\Œ,,}}\textarmenARM@i \armuh van\@empty \@empty
Œ?\arm@enc{v}{\Œ}{\Œ,,}\textarmenARM@i \armuh van\@empty \@empty
Œ?Œ,,\textarmenARM@i \armuh van\@empty \@empty
Œ?Œ,,\textARMenc {\armuh }\textarmenARM@i van\@empty \@empty
Œ?Œ,,\textarmuh\textarmenARM@i van\@empty \@empty
Œ?Œ,,\L8U\textarmuh-\textarmenARM@i van\@empty \@empty
Œ?Œ,,\textarmgobblespace van\@empty \@empty
Œ?Œ,,\L8U\textarmgobblespace- van\@empty \@empty
Œ?Œ,,\textarmenARM@i van\@empty \@empty
Œ?Œ,,\textARMenc {v}\textarmenARM@i an\@empty \@empty
Œ?Œ,,\arm@en{v}{\ŒŸ}\arm@enc{n}{iŽ}{\ŒŸ}}\textarmenARM@i an\@empty \@empty
Œ?Œ,,\arm@enc{n}{iŽ}{\ŒŸ}\textarmenARM@i an\@empty \@empty
Œ?Œ,,ŒŸ\textarmenARM@i an\@empty \@empty
Œ?Œ,,ŒŸ\textARMenc {a}\textarmenARM@i n\@empty \@empty
Œ?Œ,,ŒŸŒA\textarmenARM@i n\@empty \@empty
Œ?Œ,,ŒŸŒA\textARMenc {n}\@empty
Œ?Œ,,ŒŸŒAŒ¶\@empty
Œ?Œ,,ŒŸŒAŒ¶
```

The macro `\armen@en` (named for **e**mpy or **n**ext), looks ahead to see if the 5th-next argument token is `\@empty`, signifying that there is nothing left of the original input. (A closed bracing `{...}` counts as a single argument.) If `\@empty` the tokens in the 2nd bracing are substituted, otherwise those in the 3rd bracing. Similarly `\armen@nc` (named for **n**ext **c**haracter) looks to see whether that 5th argument token matches with the character in the 1st bracing. If so, the 2nd bracing’s tokens are substituted, else those of the 3rd bracing. This is how to cope with ‘Sh’ or ‘SH’, implemented as ligatures in an OT6 encoded font, denoting a different letter from a single ‘S’. The macro `\armuh` is used here to *prevent* a ligature from `ev` that would otherwise occur. One writes `e\armuh v` to get the separate letters. As the space becomes an active token, we need `\textarmgobblespace` to restart parsing appropriately. Of course `\textarmenARM@i` behaves like `\textgreekLGR@i` as explained earlier, with a test for `\@empty` as the 2nd token. At the end, any remaining `\@empty` expand into nothing.

Figure 13: Partial tracing of the conversion of an Armenian word, indicated by the red oval in Figure 11, from OT6 transliterated form into UTF-8 bytes. In each line, T_EX expansion occurs at the position of the left-most ‘\’. The resulting bytes are shown here in T1 encoding, as in previous examples, with ? indicating an invisible character in the byte range 0x80–0x9f. See Figure 14 for how this source appears with UTF-8 encoding.

grouping, this causes no problem elsewhere within the document. These are similar to macros `\psdaliasnames` and `\psdmapshortnames` from `hyperref.sty`, which rebind user macros to LICRs, so that PU encoded versions of LICRs can be used.

Several other ‘rebinding’ commands are defined, mostly with package-loading options.

```
\begin{decl}[]
\textARM{Se\armuh van}\\\
\textarmenARMstring {Se\armuh van}\\\
\textarmenARM@ii Se\armuh van\@empty \@empty\\\
\textARMenc {S}\textarmenARM@i e\armuh van\@empty \@empty\\\
\arm@en{S}{U}\arm@nc{h}{C}\arm@nc{H}{C}{U}}\textarmenARM@i e\armuh van\@empty ...\\\
\arm@nc{h}{C}\arm@nc{H}{C}{U}}\textarmenARM@i e\armuh van\@empty \@empty\\\
\arm@nc{H}{C}{U}\textarmenARM@i e\armuh van\@empty \@empty\\\
|U\textarmenARM@i e\armuh van\@empty \@empty\\\
|U\textARMenc {e}\textarmenARM@i \armuh van\@empty \@empty\\\
|U\textARMenc {e}\textarmenARM@i \armuh van\@empty \@empty\\\
|U\arm@en{e}{h}\arm@nc{'}{t}\arm@nc{v}{l}{h}}\textarmenARM@i \armuh van\@empty ...\\\
|U\arm@nc{'}{t}\arm@nc{v}{l}{h}}\textarmenARM@i \armuh van\@empty \@empty\\\
|U\arm@nc{v}{l}{h}\textarmenARM@i \armuh van\@empty \@empty\\\
|Uh\textarmenARM@i \armuh van\@empty \@empty\\\
|Uh\textARMenc {\armuh }\textarmenARM@i van\@empty \@empty\\\
|Uh\textarmuh\textarmenARM@i van\@empty \@empty\\\
|Uh\LL8U\textarmuh-\textarmenARM@i van\@empty \@empty\\\
|Uh\textarmgobblespace van\@empty \@empty\\\
|Uh\LL8U\textarmgobblespace- van\@empty \@empty\\\
|Uh\textarmenARM@i van\@empty \@empty\\\
|Uh\textARMenc {v}\textarmenARM@i an\@empty \@empty\\\
|Uh\arm@en{v}{l}\arm@nc{n}{q}{l}}\textarmenARM@i an\@empty \@empty\\\
|Uh\arm@nc{n}{q}{l}\textarmenARM@i an\@empty \@empty\\\
|Uh\l\textarmenARM@i an\@empty \@empty\\\
|Uh\l\textARMenc {a}\textarmenARM@i n\@empty \@empty\\\
|Uh\l\l\textarmenARM@i n\@empty \@empty\\\
|Uh\l\l\textARMenc {n}\@empty\\\
|Uh\l\l\l\@empty\\\
|Uh\l\l\l\l\|
\end{decl}
```

Figure 14: Image of part of the source coding for Figure 13, viewed as UTF-8 encoded, within editing software.

- \LIIXUmapTeXnames always defined
- \LIIXUscriptcommands handles \textsuperscript, \textsubscript, \t
- \LIIXUtipacommands handles IPA letters and symbols
- \LIIXUmaparabicletters with arbxmp
- \LIIXUmaparmenianletters with armxmp and AR8xmp
- \LIIXUmapdevaccents with devxmp
- \LIIXUmapgreekletters with grxmp and LGRxmp
- \LIIXUmaphebrewletters with hebxmp and HEBxmp
- \LIIXUmaplatinchars and \LIIXUcancelfontswitches with LATxmp
- \LIIXUmapmathletterlikes always defined
- \LIIXUmapmathspaces always defined
- \LIIXUmapmath... with mathxmp — see Section 4.3 below.

It may well be that more macro names can be added to some of these commands, to allow macro usage within the metadata. Suggestions for such additions should be sent to the pdfx package authors, along with example documents. Similarly support for more languages can be requested.

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4.3. Nested Parsing — Mathematics in Metadata

Macro commands for many mathematical symbols can be used directly in metadata without extra support; e.g., basic arithmetic operations, letter-like symbols, spacing commands. Super- and subscripted letters and numerals can use `\textsuperscript` and `\textsubscript` when there is an appropriate Unicode character (digits, comma, +/−/=, parentheses, many letters but not all).

When the `mathxmp` loading option is specified, many more symbols become available, using ‘rebinding’ macros. These are necessary, as the macros for mathematical symbols are generally *not* defined as LICRs, but use `\mathchar`. Thus new LICRs are needed, and existing names bound to these.

`\LIIXUmapmathaccents` using ‘combining’ characters from Unicode ranges at Ux0300, Ux1DC0, Ux20D0
`\LIIXUmapisomathgreek` using Ux0391–Ux03F8 for greek symbols
`\LIIXUmapmatharrowsA` supporting symbols in the Ux2190–Ux21FF block
`\LIIXUmapmathoperatorsA` supporting symbols in the Ux2200–Ux227F block
`\LIIXUmapmathoperatorsB` supporting symbols in the Ux2280–Ux22FF block
`\LIIXUmapmiscmathsymbolsA` supporting some symbols in the Ux27C0–Ux27EF range
`\LIIXUmapsupparrowsA` supporting some symbols in the Ux27F0–Ux27FF block
`\LIIXUmapsupparrowsB` supporting some symbols in the Ux2900–Ux297F block
`\LIIXUmapmiscmathsymbolsB` supporting symbols in the Ux2980–Ux29FF block
`\LIIXUmapsuppmathoperators` supporting symbols in the Ux2A00–Ux2AFF block
`\LIIXUmapunimathgreek` using Ux1D6E2–Ux1D71B for greek symbols
`\LIIXUmapmathalphabets` allows access to symbols in the Ux1D400–Ux1D755 block

The ‘parser’ macro idea can extend to handle a large class of mathematical expressions.

```
\let\(\textinlinemath
\DeclareTextCommand{\textinlinemath}{L8U}{\liixu@getinlinemath}
\def\liixu@getinlinemath#1\){\space\textmathnormalstring{#1}\space}
\DeclareTextCommand{\textmathnormalstring}{L8U}[1]{\textmathnormal@ii#1\empty\empty}
\textmathnormal@ii #1#2\empty -> ... coding to test what is in #2
... \textmathnormal{#1}\empty if #2 is \empty
... \textmathnormal{#1}\textmathnormal@ii #2\empty if #2 has more tokens
\let\[\textdisplaymath defined similarly to call \textmathnormalstring
```

This allows `\textmathnormal` to test each token, in particular mapping letters A–Za–z into the Unicode range Ux1D44E–Ux1D467 (except for *h*). Mathematical styles, such as `\mathrm`, `\mathbf`, `\mathbb` etc. can now be handled using declarations such as:

```
\Dec...positeCommand{\textmathnormal}{L8U}{\mathrm}{\liixu@mathreorder\textmathrmstring}
\Dec...positeCommand{\textmathnormal}{L8U}{\mathbf}{\liixu@mathreorder\textmathbfstring}
```

where `\liixu@mathreorder` uses some T_EX pattern-matching to allow the `\textmathrmstring` parser macro to work on the argument to `\mathrm` before allowing `\textmathnormal` parsing to continue afterwards. We refer to this as ‘nested parsing’.

Similarly ‘nested parsing’ can be used with superscripts and subscripts using `^{\dots}` and `_{\dots}` and to specify linebreaks, and even super-/subscripts within styles; viz.

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```
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{^}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{_}{\liixu@mathreorder\textsubstring}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{\}{\liixu@mathreorder\textLF}
\DeclareTextCompositeCommand{\textmathnormal}{L8U}{\cr}{\liixu@mathreorder\textLF}
\DeclareTextCompositeCommand{\textmathrm}{L8U}{^}{\liixu@mathreorder\textsuperstring}
\DeclareTextCompositeCommand{\textmathrm}{L8U}{_}{\liixu@mathreorder\textsubstring}
```

Such ‘nested parsing’ seems to be quite robust¹⁶, but a great deal more testing is required to uncover cases which may require special handling. An ultimate aim is to be able to just copy the \LaTeX source for the ‘Abstract’ of a technical paper into the `\Subject{...}` field of the `.xmpdata` file, with a large expectation that it will ‘just work’, or need only trivial edits to make it so.

4.4. Metadata in a Production Workflow

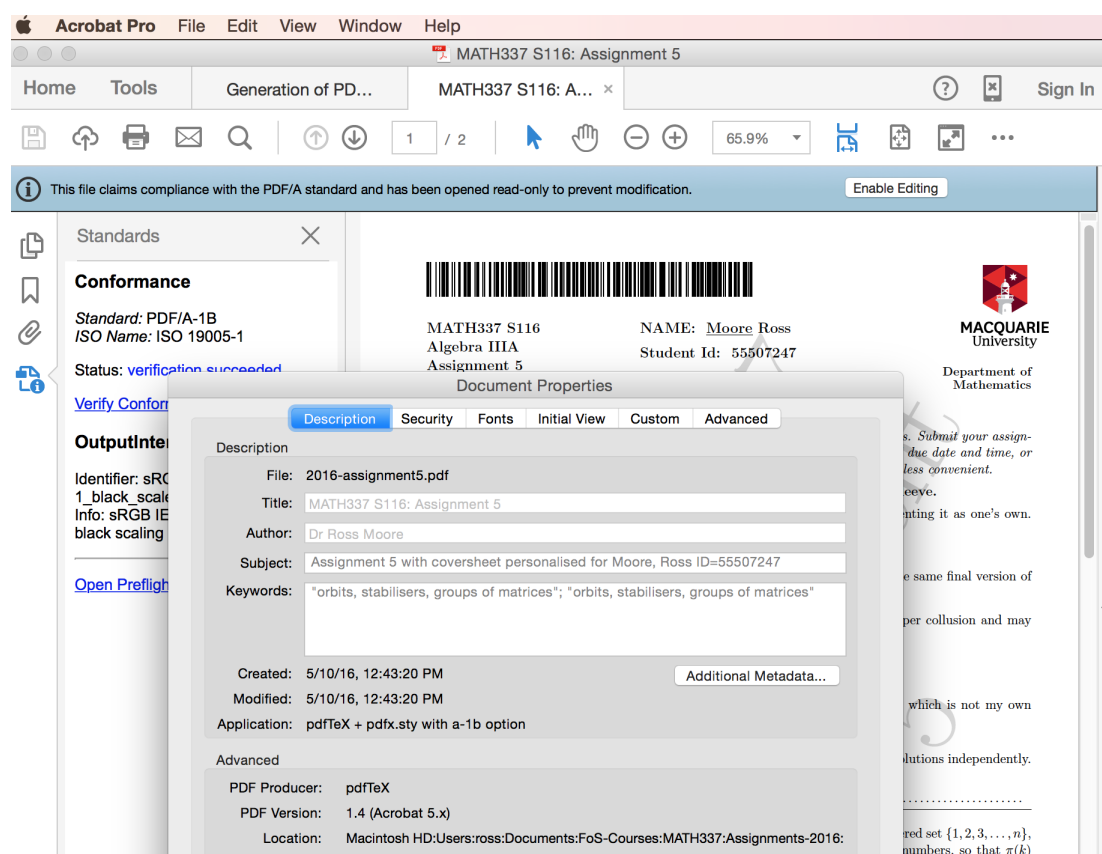


Figure 15: Metadata from student assignment papers, using information drawn from a database. The start of the \LaTeX coding for this example is shown in Figure 16.

At Macquarie University, the Mathematics Department produces personalised topmatter or coversheets for student assignments and tutorial papers using \LaTeX , incorporating information that has been stored in a database. This is done by writing extra definitions at the top of a copy of the \LaTeX source as prepared by the lecturers. For example information analogous to the following

¹⁶ ... so far, barring multi-line aligned environments.

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```
\def\thestudentname{\utext{Moore} Ross}
\def\thestudentid{55507247}
\def\theunitcode{MATH337}
\def\theoffering{S116}
\def\thetaskname{Assignment 5}
\def\theassignmentnumber{5}
\def\theduedate{09/05 2016}
...
```

is prepended to the file shown in Figure 16, for each student downloading their personalised assignment paper. The \LaTeX source makes use of this information, including recording some of it within the Metadata. When preparing such documents \LaTeX 's `\providecommand` is used

```
\providecommand{\theassignmentnumber}{5}
\providecommand{\assignLecturer}{Dr Ross Moore}
\providecommand{\theunitcode}{MATH337}
\providecommand{\theunitname}{Algebra IIIA}
\providecommand{\theyear}{2016}
...
\def\assigntopics{orbits, stabilisers, groups of matrices}
\providecommand{\pdfxopts}{a-1b}
%% XMP metadata for PDF/A conformance
\begin{filecontents*}{\jobname.xmpdata}
\Title{\theunitcode\ \theoffering: Assignment \theassignmentnumber}
\Author{\assignLecturer}
\Copyright{Macquarie University, Mathematics Department}
\Subject{Assignment \theassignmentnumber, with coversheet personalised for \thestudentname,
id = \thestudentid}
\Keywords{\assigntopics}
\Creator{pdfTeX + pdfx.sty with \pdfxopts\space option}
\pdfxEnableCommands{\def\utext#1{#1,}}
\end{filecontents*}

\documentclass[a4paper,11pt]{article}
\RequirePackage{assignments}
\usepackage[\pdfxopts]{pdfx}
```

Figure 16: Start of the \LaTeX source for an assignment paper, using macro expansion values supplied via definitions prepended to this file.

to supply default values, not drawn from the database; but when actually used, these are ignored as the required information has been supplied using \TeX 's `\def` command. The resulting metadata is as in Figure 15, showing also how the information is displayed at the top of the PDF file that is produced. Notice how a command `\utext` is included to obtain the underlining of the surname within the produced PDF. This is modified, using `\pdfxEnableCommands` in the `\jobname.xmpdata` file, to just place a comma after the surname in the metadata, as it precedes the given name.

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Another way that jobs can be customised using essentially the same T_EX source, is via the command used to initiate the job. For example the file `sample.tex`, accompanying the pdfx distribution, can be used to test the loading options to create PDFs conforming to the various flavours of PDF/A, PDF/E and PDF/X. Consider a shell script containing the following (Unix/Linux) commands.

```
pdflatex "\def\pdfxopt{a-2b}\input sample.tex"
pdflatex "\def\pdfxopt{a-2b}\input sample.tex"
mv sample.pdf sample-a2b.pdf

pdflatex "\def\pdfxopt{a-2u}\input sample.tex"
pdflatex "\def\pdfxopt{a-2u}\input sample.tex"
mv sample.pdf sample-a2u.pdf
...
```

With a 3-line block for each flavour, this produces a corresponding PDF from the same T_EX source, named according to each particular variant. A default `\providecommand{\pdfxopt}{a-1b}` at the start of `sample.tex` catches the case of normal typesetting, doing nothing when `\pdfxopt` already has an expansion value.

4.5. Further Developments

Prospects for further development of the pdfx package are as follows, listed not necessarily in order of perceived importance.

- Support for the dvips driver with Ghostscript as PDF producer; possible since gs v9.21.
- Separate the L8U pseudo-encoding support into a separate package.
- Conformance to multiple PDF standards; e.g. both PDF/A and PDF/E, both PDF/A and PDF/X with RGB or CMYK color profile, other combinations.
- Explore delaying the processing of metadata until `\begin{document}`, thereby allowing some fields to be set automatically from other information supplied within the document preamble.
- Support for input using other legacy 8-bit encodings and transliterations.
- Support for more mathematical environments within the metadata.
- Support for more PRISM metadata fields, incl. PRISM 3.0 [26].
- Explore ways to overcome incompatibilities that may arise with other packages.
- Full support for PDF/VT; in particular, transparency groups and PDF/VT-2s.
- Support for more aspects of PDF/UA and ‘Tagged PDF’.
- Develop ways to usefully use L8U apart from metadata and bookmarks.
- Support emerging standards based on PDF 2.0 [21].

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Revised as ISO 14289-1:2014 (December 2014): http://www.iso.org/iso/home/store/catalogue_tc/catalogue_detail.htm?csnumber=64599.
Available from ANSI at <https://webstore.ansi.org/Standards/ISO/ISO142892014>.
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PDF/E: <https://en.wikipedia.org/wiki/PDF/E>
PDF/VT: <https://en.wikipedia.org/wiki/PDF/VT>
PDF/UA: <https://en.wikipedia.org/wiki/PDF/UA>
PDF/X: <https://en.wikipedia.org/wiki/PDF/X>

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```
1 \ifpackageloaded{pdfxmult}{%
2   \PackageError{pdfx}%
3   {^^JThis package may not be used in conjunction with the \space
4     pdfxmult \space package}%
5   {Type \space x <return> \space to exit; or just \space <return> \space
6     to continue without this package.}%
7   \expandafter\let\csname opt@pdfx.sty\endcsname\@empty\endinput
8 }{}%
9 \NeedsTeXFormat{LaTeX2e}
10 \ProvidesPackage{pdfx}
11   [2018/12/22 v1.6.1 PDF/X and PDF/A support (CVR/HTH/RRM/PS)]
12
13 \newif\ifpdfx@noBOM \pdfx@noBOMfalse % use a BOM in the XMP packet
14 \newif\ifpdfx@x \pdfx@xfalse % PDF/X mode
15 \newif\ifpdfx@e \pdfx@efalse % PDF/E mode; not fully implemented yet
16 \newif\ifpdfx@ua \pdfx@uafalse % PDF/UA mode; not fully implemented yet
17 \newif\ifpdfx@vt \pdfx@vtfalse % PDF/VT mode, extension of PDF/X
18 \newif\ifno@iccprofile % used with PDF/X-4p and PDF/X-5pg
19 \newif\ifpdfx@noerr % error messages become just warnings
20
21 \DeclareOption{noerr}{\pdfx@noerrtrue}
22
23 %% Not all combinations of the following parameters are meaningful.
24 \def\xmp@Part{1} % PDF/A part: 1, 2, or 3
25 \def\xmp@Conformance{B} % Conformance level: A, B, or U
26 \def\xmp@ReleaseDate{2005} % 2001 for PDF/X-1, 2005 for PDF/A-1,
27 % 2010 for PDF/A-2, 2012 for PDF/A-3.
28
29 \newcount\pdfx@minorversion
```

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
30 \expandafter\ifx\csname pdfminorversion\endcsname\relax
31 \else
32   \global\pdfx@minorversion=\the\pdfminorversion
33 \fi
34
35 \def\pdfx@ErrorWarning#1#2#3#4{%
36   \ifpdfx@noerr \PackageWarning{pdfx}{#1.^J #2#3.^J}%
37   \else \PackageError{pdfx}{#1}{#2#4.^J
38     Use option 'noerr' to avoid this message.^J}%
39   \fi}
40
41 \def\pdfx@Xvn@message{%
42   \pdfx@ErrorWarning{PDF/X-5n has no default profile}%
43   {Provide your own}; continuing to build a non-valid document}%
44   {, else continue to build a non-valid document}%
45 }
46
47 %% PDF/A options
48 %% default is to create PDF/A-1b
49 %% options can change this for PDF/X or higher levels of PDF/A
50 \DeclareOption{a-1a}{\global\pdfx@xfalse\def\xmp@Part{1}%
51   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2005}}
52 \DeclareOption{a-1b}{\global\pdfx@xfalse\def\xmp@Part{1}%
53   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2005}}
54 \DeclareOption{a-2a}{\global\pdfx@xfalse\def\xmp@Part{2}%
55   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2010}}
56 \DeclareOption{a-2b}{\global\pdfx@xfalse\def\xmp@Part{2}%
57   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2010}}
58 \DeclareOption{a-2u}{\global\pdfx@xfalse\def\xmp@Part{2}%
59   \def\xmp@Conformance{U}\def\xmp@ReleaseDate{2010}}
60 \DeclareOption{a-3a}{\global\pdfx@xfalse\def\xmp@Part{3}%
61   \def\xmp@Conformance{A}\def\xmp@ReleaseDate{2012}}
62 \DeclareOption{a-3b}{\global\pdfx@xfalse\def\xmp@Part{3}%
63   \def\xmp@Conformance{B}\def\xmp@ReleaseDate{2012}}
64 \DeclareOption{a-3u}{\global\pdfx@xfalse\def\xmp@Part{3}%
65   \def\xmp@Conformance{U}\def\xmp@ReleaseDate{2012}}
66 %%
67 %% PDF/X options
68 %% comments added, using
69 %% https://www.eci.org/_media/downloads/pdfx/pdfx_faq_english_nov05.pdf
70 %% https://en.wikipedia.org/wiki/PDF/X#List_of_the_PDF.2FX_standards
71 %%
72 \DeclareOption{x-1}{\global\pdfx@xtrue\def\xmp@Part{1}% obsolete
73   \def\xmp@Conformance{a}\def\xmp@ReleaseDate{1999}% CMYK only
74   \global\pdfx@minorversion=2\relax
75   \pdfx@ErrorWarning{PDF/X-1:1999 is no longer an accepted standard}%
76   {Use option x-1a1 or x-1a3 }; continuing to build a non-valid document}%
77   {, else continue to build a non-valid document.}%
78 }% effectively same as x-1a1
79 \DeclareOption{x-1a}{\global\pdfx@xtrue\def\xmp@Part{1}% CMYK only
80   \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2003}%
81   \global\pdfx@minorversion=3}% same as x-1a3
```


Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
82 \DeclareOption{x-1a1}{\global\pdfx@true\def\xmp@Part{1}%
83 \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2001}% ISO 15930-1:2001
84 \global\pdfx@minorversion=3 }
85 \DeclareOption{x-1a3}{\global\pdfx@true\def\xmp@Part{1}%
86 \def\xmp@Conformance{a}\def\xmp@ReleaseDate{2003}% ISO 15930-4:2003
87 \global\pdfx@minorversion=3 }
88 \DeclareOption{x-2}{\global\pdfx@true\def\xmp@Part{2}% XMP Metadata
89 %% \def\xmp@Conformance{}\def\xmp@ReleaseDate{2002}% ISO 15930-2:2003
90 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}% ISO 15930-5, withdrawn 2011
91 \global\pdfx@minorversion=4\relax
92 \pdfx@ErrorWarning{PDF/X-2:2003 was never published as a standard}%
93 {Use option x-1a or x-3 }{; continuing to build a non-valid document}%
94 {, else continue to build a non-valid document}%
95 }% external OPI workflow, i.e. multiple files involved
96 \DeclareOption{x-3}{\global\pdfx@true\def\xmp@Part{3}% RGB allowed, but rare!
97 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}%
98 \global\pdfx@minorversion=4 }% same as x-303
99 \DeclareOption{x-302}{\global\pdfx@true\def\xmp@Part{3}%
100 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2002}% ISO 15930-3:2002
101 \global\pdfx@minorversion=3 }
102 \DeclareOption{x-303}{\global\pdfx@true\def\xmp@Part{3}%
103 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2003}% ISO 15930-6:2003
104 \global\pdfx@minorversion=4 }
105 %% Later versions, yet to be fully implemented
106 \DeclareOption{x-4}{\global\pdfx@true\def\xmp@Part{4}%
107 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2010}% ISO 15930-7:2010
108 \global\pdfx@minorversion=6 }% same as x-410
109 \DeclareOption{x-4p}{\global\pdfx@true\global\no@iccprofiletrue
110 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2010}%
111 \global\pdfx@minorversion=6 }% same as x-4p10
112 \DeclareOption{x-408}{\global\pdfx@true\def\xmp@Part{4}%
113 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}% ISO 15930-7:2008
114 \global\pdfx@minorversion=6 }
115 \DeclareOption{x-410}{\global\pdfx@true\def\xmp@Part{4}%
116 \def\xmp@Conformance{}\def\xmp@ReleaseDate{2010}% ISO 15930-7:2010
117 \global\pdfx@minorversion=6 }
118 \DeclareOption{x-4p08}{\global\pdfx@true\global\no@iccprofiletrue
119 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2008}%
120 \global\pdfx@minorversion=6 }% ISO 15930-7:2010
121 \DeclareOption{x-4p10}{\global\pdfx@true\global\no@iccprofiletrue
122 \def\xmp@Part{4}\def\xmp@Conformance{p}\def\xmp@ReleaseDate{2010}%
123 \global\pdfx@minorversion=6 }% ISO 15930-7:2010
124 \DeclareOption{x-5}{\global\pdfx@true\def\xmp@Part{5}%
125 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
126 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
127 \DeclareOption{x-5g}{\global\pdfx@true\def\xmp@Part{5}%
128 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
129 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
130 \DeclareOption{x-5n}{\global\pdfx@true %\global\no@iccprofiletrue
131 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2010}%
132 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2010
133 \DeclareOption{x-5pg}{\global\pdfx@true\global\no@iccprofiletrue
```

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```
134 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2010}%
135 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
136 \DeclareOption{x-508}{\global\pdfx@true\def\xmp@Part{5}%
137 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
138 \global\pdfx@minorversion=6 }% ISO 15930-8:2008
139 \DeclareOption{x-5g08}{\global\pdfx@true\def\xmp@Part{5}%
140 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2008}%
141 \global\pdfx@minorversion=6 }% ISO 15930-8:2008
142 \DeclareOption{x-5n08}{\global\pdfx@true %\global\no@iccprofiletrue
143 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2008}%
144 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2008
145 \DeclareOption{x-5pg08}{\global\pdfx@true\global\no@iccprofiletrue
146 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2008}%
147 \global\pdfx@minorversion=6 }% ISO 15930-8:2008
148 \DeclareOption{x-510}{\global\pdfx@true\def\xmp@Part{5}%
149 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2010}%
150 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
151 \DeclareOption{x-5g10}{\global\pdfx@true\def\xmp@Part{5}%
152 \def\xmp@Conformance{g}\def\xmp@ReleaseDate{2010}%
153 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
154 \DeclareOption{x-5n10}{\global\pdfx@true %\global\no@iccprofiletrue
155 \def\xmp@Part{5}\def\xmp@Conformance{n}\def\xmp@ReleaseDate{2010}%
156 \global\pdfx@minorversion=6 \pdfx@Xvn@message}% ISO 15930-8:2010
157 \DeclareOption{x-5pg10}{\global\pdfx@true\global\no@iccprofiletrue
158 \def\xmp@Part{5}\def\xmp@Conformance{pg}\def\xmp@ReleaseDate{2010}%
159 \global\pdfx@minorversion=6 }% ISO 15930-8:2010
160 %%
161 %% PDF/E options
162 %%
163 \DeclareOption{e}{\global\pdfx@false\global\pdfx@true
164 \def\xmp@Part{1}\def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}%
165 \gdef\thepdfminorversion{6}% same as e-1
166 }
167 \DeclareOption{e-1}{\global\pdfx@false\global\pdfx@true
168 \def\xmp@Part{1}\def\xmp@Conformance{}\def\xmp@ReleaseDate{2008}%
169 \gdef\thepdfminorversion{6}% ISO 24517-1:2008
170 }
171 %% PDF/UA options
172 %%
173 \let\xmp@PDFUA@empty
174 \DeclareOption{ua}{\global\pdfx@uatrue % ISO 14289-1:2012, 2014
175 \def\xmp@UAlevel{1}\let\xmp@PDFUA@relax}% same as ua-1
176 \DeclareOption{ua-1}{\global\pdfx@uatrue % ISO 14289-1:2012, 2014
177 \def\xmp@UAlevel{1}\let\xmp@PDFUA@relax}
178 %%
179 %% PDF/VT options
180 %%
181 \DeclareOption{vt-1}{\global\pdfx@true\global\pdfx@vttrue
182 \def\xmp@Part{4}\def\xmp@vtPart{1}\def\xmp@Conformance{}}%
183 \def\xmp@vtConformance{}\def\xmp@ReleaseDate{2010}%
184 \gdef\xmpMM@VersionID{1}%
185 \global\pdfx@minorversion=6 }
```

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```
186 \DeclareOption{vt-2}{\global\pdfx@true\global\pdfx@vtrue
187   \global\no@iccprofiletrue \gdef\xmpMM@VersionID{1}%
188   \def\xmp@Part{5}\def\xmp@vtPart{2}\def\xmp@Conformance{pg}%
189   \def\xmp@vtConformance{}\def\xmp@ReleaseDate{2010}%
190   \global\pdfx@minorversion=6 }
191 \DeclareOption{vt-2s}{\global\pdfx@true\global\pdfx@vtrue
192   \global\no@iccprofiletrue \gdef\xmpMM@VersionID{1}%
193   \def\xmp@Part{5}\def\xmp@vtPart{2}\def\xmp@Conformance{pg}%
194   \def\xmp@vtConformance{s}\def\xmp@ReleaseDate{2010}%
195   \global\pdfx@minorversion=6 }
196
197 %% options to alter PDF minor version, in case needed in special circumstances
198 \DeclareOption{pdf12}{\global\pdfx@minorversion=2 }% 1999
199 \DeclareOption{pdf13}{\global\pdfx@minorversion=3 }% 2001 Acrobat 4 (ISBN 0-201-61588-6)
200 \DeclareOption{pdf14}{\global\pdfx@minorversion=4 }% 2003 Acrobat 5 (ISBN 0-201-75839-3)
201 \DeclareOption{pdf15}{\global\pdfx@minorversion=5 }% 2005 Acrobat 6
202 \DeclareOption{pdf16}{\global\pdfx@minorversion=6 }% 2006 Acrobat 7 (ISBN 0-321-30474-8)
203 \DeclareOption{pdf17}{\global\pdfx@minorversion=7 }% 2008 ISO 32000-1:2008
204
205 %% inhibits writing the XMP byte-order marker
206 \DeclareOption{noBOM}{\pdfx@noBOMtrue}
207 \DeclareOption{useBOM}{\pdfx@noBOMfalse}
208
209 %% options for language character macros in XMP metadata
210 \newif\ifcyrxmp
211 \newif\ifcyrKOIxm
212 \newif\ifgrxmp
213 \newif\ifgrkLGRxm
214 \newif\ifhebxmp
215 \newif\ifhebHEBxm
216 \newif\ifarbxmp
217 \newif\ifarmxm
218 \newif\ifarmSCIxmp
219 \newif\ifdevxm
220 \newif\ifvnmxm
221 \newif\iflatEXTxm
222 \newif\iflatLATxm
223 \newif\ifipaxmp
224 \newif\ifmathxm
225
226 \DeclareOption{latxm}{\global\latEXTxmtrue}
227 \DeclareOption{LATxm}{\global\latLATxmtrue\global\latEXTxmtrue}
228 \DeclareOption{cyrxm}{\global\cyrxmtrue}
229 \DeclareOption{KOIxmp}{\global\cyrKOIxmptrue\global\cyrxmtrue}
230 \DeclareOption{grxm}{\global\grxmtrue}
231 \DeclareOption{LGRxm}{\global\grkLGRxmtrue\global\grxmtrue}
232 \DeclareOption{hebxmp}{\global\hebxmptrue}
233 \DeclareOption{HEBxm}{\global\hebHEBxmtrue\global\hebxmptrue}
234 \DeclareOption{arbxmp}{\global\arbxmptrue}
235 \DeclareOption{armxm}{\global\armxmtrue}
236 \DeclareOption{AR8xm}{\global\armSCIxmptrue\global\armxmtrue}
237 \DeclareOption{devxm}{\global\devxmtrue}
```

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```
238 \DeclareOption{vnmxmp}{\global\vnmxmpttrue}
239 \DeclareOption{ipaxmp}{\global\ipaxmpttrue\global\latEXTxmpttrue}
240 \DeclareOption{mathxmp}{\global\mathxmpttrue\global\grkxmpttrue}
241
242 %% all the above
243 \DeclareOption{allxmp}{%
244   \global\cyrxmpttrue
245   \global\cyrkOIxmpttrue
246   \global\grkxmpttrue
247   \global\grkLGRxmpttrue
248   \global\hebxmpttrue
249   \global\hebHEBxmpttrue
250   \global\arbxmpttrue
251   \global\armxmpttrue
252   \global\armSCIxmpttrue
253   \global\devxmpttrue
254   \global\vnmxmpttrue
255   \global\latEXTxmpttrue
256   \global\latLATxmpttrue
257   \global\vnmxmpttrue
258   \global\ipaxmpttrue
259   \global\mathxmpttrue
260   \global\let\pdfx@useactivespacestrue\pdfx@useactivespacesfalse
261 }
262
263 \newif\ifpdfx@useactivespaces
264
265 \ExecuteOptions{noBOM,a-1b}
266 \ProcessOptions
267
268 \ifpdfx@ua\ifpdfx@x\else
269   \expandafter\if\xmp@Conformance A\else
270     \pdfx@ErrorWarning{PDF/UA requires 'Tagged PDF' for any structure.^^J
271     Then PDF/A Conformance must be 'a'}%
272     {Use option 'a-\xmp@Part a'}%
273     {; continuing with a likely invalid document}%
274     {, or continue for a likely invalid document}%
275     %% \gdef\xmp@Conformance{A}% do we want this?
276 \fi\fi\fi
277
278 \expandafter\ifx\csname pdflastobj\endcsname\relax
279 \else
280   \ifnum\pdflastobj >\z@ % pdftex has already written objects
281   \ifnum\pdfx@minorversion=\pdfminorversion\else
282     \PackageError{pdfx}%
283       {^^J(pdfx) Cannot change the \string\pdfminorversion^^J%
284       (pdfx) PDF version remains at 1.\the\pdfminorversion.^^J%
285       (pdfx) Use \string\pdfminorversion=\the\pdfx@minorversion\space
286       before \string\documentclass}%
287     {(pdfx) Another package or document-class has written objects into the PDF.^^J%
288     (pdfx) Hit return to continue with PDF version 1.\the\pdfminorversion.%
289     }%
```

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```
290 \global\pdfx@minorversion=\the\pdfminorversion
291 \fi
292 \else
293 \global\pdfminorversion\pdfx@minorversion
294 \fi
295 \fi
296
297 \expandafter\ifx\csname thepdfminorversion\endcsname\relax
298 \expandafter\ifx\csname pdfminorversion\endcsname\relax
299 \else
300 \xdef\thepdfminorversion{\the\pdfminorversion}
301 \fi\fi
302
303 \expandafter\ifx\csname pdfminorversion\endcsname\relax
304 \gdef\thepdfminorversion{4}% assumed with XeTeX
305 \def\pdf@minorversion@xetex=#1{\gdef\thepdfminorversion{#1}}%
306 \let\pdfminorversion\pdf@minorversion@xetex
307 \else
308 \ifnum\pdfminorversion < 4\relax
309 \ifpdfx@x
310 % more testing needed with PDF/X
311 \else
312 \pdfminorversion=4\relax % assumed for PDF/A ; options may change this for PDF/X
313 \gdef\thepdfminorversion{4}%
314 \fi
315 \else
316 \ifnum\pdfminorversion<\thepdfminorversion\relax
317 \global\pdfminorversion=\thepdfminorversion\relax
318 \fi
319 \fi
320 \fi
321 \expandafter\ifx\csname pdfresetpageorigin\endcsname\relax\else
322 \pdfresetpageorigin=0
323 \fi
324
325
326 \newif\ifpdfx@nopdfinfo
327 \ifmathxmp\pdfx@nopdfinfotrue
328 \else
329 \iflatLATxmp\pdfx@nopdfinfotrue
330 \else
331 \ifgrkLGRxmp\pdfx@nopdfinfotrue
332 \else
333 \ifhebHEBxmp\pdfx@nopdfinfotrue
334 \else
335 \ifcyrK0Ixm\pdfx@nopdfinfotrue
336 \else
337 \ifarmSCIxm\pdfx@nopdfinfotrue
338 \fi\fi\fi\fi\fi\fi
339
340 \iflatLATxmp\pdfx@useactivespacestrue\fi
341 \ifgrkLGRxmp\pdfx@useactivespacestrue\fi
```

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```
342 \ifhebrewHEBxmp\pdfx@useactivespacestrue\fi
343 \ifcyrK0Ixm\pdfx@useactivespacestrue\fi
344 \ifarmSCIxm\pdfx@useactivespacestrue\fi
345
346 \newif\ifpdfx@transliterated
347 \ifgrkLGRxm\pdfx@transliteratedtrue\fi
348 \ifhebrewHEBxmp\pdfx@transliteratedtrue\fi
349 \ifarmSCIxm\pdfx@transliteratedtrue\fi
350
351 \RequirePackage{iftex}
352 \RequirePackage{ifpdf}
353 %% Support for pdfTeX primitives when using XeTeX:
354 \RequirePackage{ifxetex}
355 \ifxetex
356   \def\pdfx@pages@xetex#1{\special{pdf:put @pages <<#1>>}}
357   \def\pdfx@pageattr@xetex#1{\special{pdf:put @thispage <<#1>>}}
358   \def\pdfx@docinfo@xetex#1{\special{pdf:put @docinfo <<#1>>}}
359   \def\pdfx@catalog@xetex#1{\special{pdf:put @catalog <<#1>>}}
360   \def\pdfx@mapline@xetex#1{\special{pdf:mapline #1}}% does this work ??
361   %% \def\pdfx@mapline@xetex#1{}
362   \def\pdf@compress@xetex=#1{}
363   %%
364   \let\pdfpagesattr\pdfx@pages@xetex
365   \let\pdfinfo\pdfx@docinfo@xetex
366   \let\pdfcatalog\pdfx@catalog@xetex
367   \let\pdfmapline\pdfx@mapline@xetex
368   \let\pdfcompresslevel\pdf@compress@xetex
369   \let\pdfobjcompresslevel\pdf@compress@xetex
370 \fi
371
372 %%\newif\ifpdfx@pdfmark % control future support for dvips
373
374 \RequirePackage{everyshi}
375 \RequirePackage{ifluatex}
376 \ifluatex
377   \IfFileExists{luatex85.sty}{% 2016+
378     \RequirePackage{luatex85}%
379     \edef\pdfcreationdate{\pdfcreationdate}%
380   }{% earlier versions
381   }%
382   \RequirePackage{pdftexcmds}%
383   \let\pdfx@mdfivesum\pdf@mdfivesum
384   \let\pdfescapestring\pdf@escapestring
385 \else
386   \ifxetex
387     \expandafter\ifx\csname mdfivesum\endcsname\relax
388       % too early a version of XeTeX
389       \let\pdfx@mdfivesum\relax
390     \else
391       % since mid-2015
392       \let\pdfx@mdfivesum\mdfivesum
393     \fi
```


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```
394 \else
395   \let\pdfx@mdfivesum\pdfmdfivesum
396 \fi
397 \fi
398 \def\pdfx@encodingfile{l8u-penc.def}
399
400 \expandafter\ifx\csname pdftexbanner\endcsname\relax
401 \expandafter\ifx\csname luatexbanner\endcsname\relax
402   \else % luatex85
403     \let\pdftexbanner\luatexbanner
404   \fi
405 \else % pdfTeX, but which version ???
406   {\endlinechar=-1
407   \everyeof{\noexpand}%
408   \xdef\pdfx@bannerstring{\expandafter\scantokens\expandafter{\pdftexbanner}}
409   }%
410   \def\pdfx@testbannerstr{%
411     This is pdfTeX, Version 3.14159265-2.6-1.40.15 (TeX Live 2014/dev)
412     kpathsea version 6.2.0dev}%
413   \ifx\pdfx@bannerstring\pdfx@testbannerstr
414     \typeout{This version of pdfTeX cannot write out upper-range character bytes,
415       128-255.}%
416     \typeout{Any UTF-8 Unicode characters in the Metadata will not be written
417       correctly.}%
418     \typeout{Please update to a more stable version of pdfTeX.^^J}%
419   \fi
420 \fi
421
422 %% How to support XeTeX here ?
423 \ifpdfx@x
424   \pdfobjcompresslevel=0 \relax
425   \expandafter\ifx\csname pdfinterwordspaceoff\endcsname\relax\else
426     \pdfinterwordspaceoff
427     \let\pdfinterwordspaceon\pdfinterwordspaceoff
428     \let\pdfinterwordspace\relax
429   \fi
430   \expandafter\ifx\csname pdfgeninterwordspace\endcsname\relax\else
431     \pdfgeninterwordspace=0 \relax
432   \fi
433   \begingroup
434     \dimen0=0.996264009963\paperwidth\relax
435     \edef\pdfx@mwidth{\strip@pt\dimen0}%
436     \advance\dimen0 -25\p@
437     \edef\pdfx@twidth{\strip@pt\dimen0}%
438     \dimen0=0.996264009963\paperheight\relax
439     \edef\pdfx@mheight{\strip@pt\dimen0}%
440     \advance\dimen0 -20\p@
441     \edef\pdfx@theight{\strip@pt\dimen0}%
442   \ifxetex
443     \xdef\pdfx@everypage@xetex{%
444       /MediaBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
445       /BleedBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
```

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```
446     /CropBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
447     /TrimBox[25 20 \pdfx@twidth\space \pdfx@theight]%
448   }%
449   \fi
450   \edef\next{\endgroup\pdfpagesattr{%
451     /MediaBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
452   %%     /ArtBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
453     /BleedBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
454     /CropBox[0 0 \pdfx@mwidth\space \pdfx@mheight]^^J
455     /TrimBox[25 20 \pdfx@twidth\space \pdfx@theight]}
456   }\next
457   \ifxetex
458     \AtBeginDvi{%
459       \expandafter\immediate\pdfx@pageattr@xetex{\pdfx@everypage@xetex}}%
460     \EveryShipout{%
461       \expandafter\immediate\pdfx@pageattr@xetex{\pdfx@everypage@xetex}}%
462     \else
463       \EveryShipout{%
464         \expandafter\ifx\expandafter\relax\the\pdfpageattr\relax
465           \immediate\pdfpageattr\expandafter{\the\pdfpagesattr}%
466         \fi }%
467       \fi
468     \else
469     %% PDF/A-1b doesn't allow object compression
470     \ifnum\xmp@ReleaseDate=2005\relax
471       \expandafter\ifx\csname pdfobjcompresslevel\endcsname\relax
472       \else
473         \pdfobjcompresslevel=0\relax
474       \fi \fi
475     \fi
476   \ifxetex
477     %% How to support XeTeX here ?
478   \else
479     \ifnum\thepdfminorversion >3 \relax
480       \expandafter\ifx\csname pdfsuppresswarningdupmap\endcsname\relax
481       \expandafter\ifx\csname pdfmapline\endcsname\relax\else
482         \pdfmapline{+dummy-space <dummy-space.pfb}
483       \fi
484     \else
485       \advance\pdfsuppresswarningdupmap 1
486       \pdfmapline{+dummy-space <dummy-space.pfb}
487       \advance\pdfsuppresswarningdupmap -1
488     \fi
489     \expandafter\ifx\csname pdfgeninterwordspace\endcsname\relax\else
490       \pdfgeninterwordspace=1 \relax
491     \fi
492   \fi
493   \fi
494
495   \ifluatex\else\ifxetex\else
496     \@ifpackageloaded{inputenc}{%
497     }{%
```

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```
498 \RequirePackage{inputenc}
499 % allow this to be loaded again cleanly
500 \expandafter\let\csname ver@inputenc.sty\endcsname\relax
501 }
502 \fi\fi
503
504 %% pseudo-declare the L8U encoding
505 \expandafter\let\csname L8U-cmd\expandafter\endcsname\csname OT1-cmd\endcsname
506 \@namedef{T@L8U}{}%
507 \@namedef{D@L8U}{}%
508 \@namedef{M@L8U}{}%
509
510 %% adjust to LaTeX's 2018 change to the default encoding
511 \expandafter\ifx\csname inputencodingname\endcsname\relax
512 \else
513 \def\pdfx@restoreencoding#1{%
514 \@tempcnta=128
515 \loop
516 \catcode\@tempcnta=13
517 \advance\@tempcnta\@ne
518 \ifnum\@tempcnta<256
519 \repeat
520 \inputencoding{#1}%
521 }%
522 \AtEndOfPackage{\pdfx@restoreencoding\pdfx@inputencodingname}%
523 \let\pdfx@inputencodingname\inputencodingname
524 \let\pdfx@DeclareUnicodeCharacter\DeclareUnicodeCharacter
525 \UseRawInputEncoding
526 \fi
527 \InputIfFileExists{\pdfx@encodingfile}{}{}
528 \expandafter\ifx\csname pdfx@inputencodingname\endcsname\relax
529 \else
530 \let\inputencodingname\pdfx@inputencodingname
531 \let\DeclareUnicodeCharacter\pdfx@DeclareUnicodeCharacter
532 \let\DeclareFontEncoding\pdfx@DeclareFontEncoding
533 \inputencoding{\inputencodingname}%
534 \fi
535
536 %%-----
537 %% Macros for reading XMP data with special catcodes. Usage:
538 %%
539 %% \xmp@parse{continuation}{data}
540 %%
541 %% The effect is to read the data with special catcodes: '<', '>', and
542 %% '&' are "active", and '^', '_', '#', '$', '~' are "other". The data
543 %% is then bound to the locally scoped name \@this, and the
544 %% continuation is called.
545 \def\xmp@parse#1{%
546 \begingroup
547 \catcode'\<=13\catcode'\>=13\catcode'\&=13\catcode'\^=12
548 \catcode'\_ =12\catcode'\#=12\catcode'\$=12\catcode'\~=12
549 \ifpdfx@useactivespaces\obeyspaces\fi % capture spaces as active characters
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
550 \xmp@doparse{#1}%
551 }
552 \def\afterxmp@parse{ }% methods may change this
553 \def\xmp@doparse#1#2{%
554   \def\@this{#2}#1
555   \endgroup
556   % do any post-processing
557   \afterxmp@parse
558   \def\afterxmp@parse{ }%
559 }
560
561 %%-----
562 %% Local commands. They are only brought into scope during the reading
563 %% of xmpdata. Some fields can have a 'xml:lang' attribute; others must have.
564 %% LANG values as in: (BCP 47) https://tools.ietf.org/html/rfc5646#appendix-A
565 %%
566 \def\xmp@lang@Default{x-default}
567 \let\xmp@lang@Title\xmp@lang@Default
568 \let\xmp@lang@Author\xmp@lang@Default
569 \let\xmp@lang@Keywords\xmp@lang@Default
570 \let\xmp@lang@Subject\xmp@lang@Default
571 %%\def\xmp@lang@CreatorTool{\xmp@lang@Default}
572 \let\xmp@lang@Producer\xmp@lang@Default
573 %%\def\xmp@lang@Volume{\xmp@lang@Default}
574 %%\def\xmp@lang@Issue{\xmp@lang@Default}
575 \let\xmp@lang@Copyright\xmp@lang@Default
576 \let\xmp@lang@PublicationType\xmp@lang@Default
577 \let\xmp@lang@Publisher\xmp@lang@Default
578 \let\xmp@lang@Coverage\xmp@lang@Default
579 \let\xmp@lang@Contributor\xmp@lang@Default
580 \let\xmp@lang@Relation\xmp@lang@Default
581 %%% PRISM fields
582 \let\xmp@lang@CoverDisplayDate\xmp@lang@Default
583 \let\xmp@lang@JournalTitle\xmp@lang@Default
584 %%\def\xmp@lang@JournalNumber{\xmp@lang@Default}
585 %%% xmp: & xmpRights: fields
586 \let\xmp@lang@Advisory\xmp@lang@Default
587 \let\xmp@lang@Identifier\xmp@lang@Default
588 \let\xmp@lang@Nickname\xmp@lang@Default
589 \let\xmp@lang@Owner\xmp@lang@Default
590
591 %% some validators require a language attribute for
592 %% dc:title set via \Title
593 %% dc:description set via \Subject
594 %% dc:rights set via \Copyright
595 %% xmpRights:UsageTerms set via \Copyright
596 %%
597 {\catcode '\ " 12 \catcode'\: 12 \catcode'\= 12
598 \gdef\pdfx@xmp@checklang#1{%
599   \ifx #1\xmp@lang@Default\else\space xml:lang="#1"\fi}
600 \gdef\pdfx@xmp@strictlang#1{\space xml:lang="#1"}
601}% end of \catcodes
```

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```
602 \let\xmp@checklang\pdfx@xmp@checklang
603 \let\xmp@strictlang\pdfx@xmp@strictlang
604
605 \newcommand{\pdfx@Title}[1][]{%
606   \ifx\relax#1\relax\else\gdef\xmp@lang@Title{#1}\fi
607   \xmp@parse{\global\let\xmp@Title\@this}}
608
609 %% allow for multiple authors, keywords and languages
610 %% also: contributor, date, relation, type, thumbnails
611 %% and AuthoritativeDomain, Advisory, Identifier, Owner
612 \newcommand{\pdfx@Author}[1][]{%
613   \ifx\relax#1\relax\else\gdef\xmp@lang@Author{#1}\fi
614   \def\afterxmp@parse{\let\Author\pdfx@extraAuthor}%
615   \xmp@parse{\global\let\xmp@Author\@this}}
616 \newcommand{\pdfx@Keywords}[1][]{%
617   \ifx\relax#1\relax\else\gdef\xmp@lang@Keywords{#1}\fi
618   \def\afterxmp@parse{\let\Keywords\pdfx@extraKeywords}%
619   \xmp@parse{\global\let\xmp@Keywords\@this}}
620 \newcommand{\pdfx@Language}{%
621   \def\afterxmp@parse{\let\Language\pdfx@extraLanguages}%
622   \xmp@parse{\global\let\xmp@Language\@this}}
623
624 \newcommand{\pdfx@AuthoritativeDomain}{%
625   \def\afterxmp@parse{\let\AuthoritativeDomain\pdfx@extraAuthoritativeDomain}%
626   \xmp@parse{\global\let\xmp@AuthoritativeDomain\@this}}
627 \newcommand{\pdfx@Date}{%
628   \def\afterxmp@parse{\let\Date\pdfx@extraDate}%
629   \xmp@parse{\global\let\xmp@Date\@this}}
630 \newcommand{\pdfx@Contributor}[1][]{%
631   \ifx\relax#1\relax\else\gdef\xmp@lang@Contributor{#1}\fi
632   \def\afterxmp@parse{\let\Contributor\pdfx@extraContributor}%
633   \xmp@parse{\global\let\xmp@Contributor\@this}}
634 \newcommand{\pdfx@Relation}[1][]{%
635   \ifx\relax#1\relax\else\gdef\xmp@lang@Relation{#1}\fi
636   \def\afterxmp@parse{\let\Relation\pdfx@extraRelation}%
637   \xmp@parse{\global\let\xmp@Relation\@this}}
638 %% \newcommand{\pdfx@Type}[1][]{%
639 %%   \ifx\relax#1\relax\else\gdef\xmp@lang@Type{#1}\fi
640 %%   \def\afterxmp@parse{\let\Type\pdfx@extraType}%
641 %%   \xmp@parse{\global\let\xmp@Type\@this}}
642
643 \newcommand{\pdfx@Advisory}[1][]{%
644   \ifx\relax#1\relax\else\gdef\xmp@lang@Advisory{#1}\fi
645   \def\afterxmp@parse{\let\Advisory\pdfx@extraAdvisory}%
646   \xmp@parse{\global\let\xmp@Advisory\@this}}
647 \newcommand{\pdfx@Identifier}[1][]{%
648   \ifx\relax#1\relax\else\gdef\xmp@lang@Identifier{#1}\fi
649   \def\afterxmp@parse{\let\Identifier\pdfx@extraIdentifier}%
650   \xmp@parse{\global\let\xmp@Identifier\@this}}
651 \newcommand{\pdfx@Thumbnails}{%
652   \def\afterxmp@parse{\let\Thumbnails\pdfx@extraThumbnails}%
653   \xmp@parse{\global\let\xmp@Thumbnails\@this}}
```

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```
654
655 \newcommand{\pdfx@Owner}[1][ ]{%
656   \ifx\relax#1\relax\else\gdef\xmp@lang@Owner{#1}\fi
657   \def\afterxmp@parse{\let\Owner\pdfx@extraOwner}%
658   \xmp@parse{\global\let\xmp@Owner\@this}}
659
660 {\obeyspaces%
661   \ifpdfx@useactivespaces\gdef\pdfx@insert@sep{\sep }%
662   \else\gdef\pdfx@insert@sep{\sep}\fi%
663 }
664 \newcommand{\pdfx@extraAuthor}[1][ ]{%
665   \ifx\relax#1\relax
666     \expandafter\expandafter\expandafter\gdef
667       \expandafter\expandafter\expandafter\xmp@Author
668         \expandafter\expandafter\expandafter{%
669           \expandafter\xmp@Author\pdfx@insert@sep}%
670   \else
671     \expandafter\expandafter\expandafter\gdef
672       \expandafter\expandafter\expandafter\xmp@Author
673         \expandafter\expandafter\expandafter{%
674           \expandafter\xmp@Author\pdfx@insert@sep[#1]}%
675   \fi
676   \def\afterxmp@parse{%
677     \expandafter\expandafter\expandafter\gdef
678       \expandafter\expandafter\expandafter\xmp@Author
679       \expandafter\expandafter\expandafter{%
680         \expandafter\xmp@Author\xmp@extraAuthor}%
681     }%
682   \xmp@parse{\global\let\xmp@extraAuthor\@this}%
683   }%
684 \newcommand{\pdfx@extraKeywords}[1][ ]{%
685   \ifx\relax#1\relax
686     \expandafter\expandafter\expandafter\gdef
687       \expandafter\expandafter\expandafter\xmp@Keywords
688         \expandafter\expandafter\expandafter{%
689           \expandafter\xmp@Keywords\pdfx@insert@sep}%
690   \else%
691     \expandafter\expandafter\expandafter\gdef
692       \expandafter\expandafter\expandafter\xmp@Keywords
693         \expandafter\expandafter\expandafter{%
694           \expandafter\xmp@Keywords\pdfx@insert@sep[#1]}%
695   \fi%
696   \def\afterxmp@parse{%
697     \expandafter\expandafter\expandafter\gdef
698       \expandafter\expandafter\expandafter\xmp@Keywords
699       \expandafter\expandafter\expandafter{%
700         \expandafter\xmp@Keywords\xmp@extraKeywords}}%
701   \xmp@parse{\global\let\xmp@extraKeywords\@this}%
702   }%
703 \newcommand{\pdfx@extraLanguages}{%
704   \expandafter\expandafter\expandafter\gdef
705     \expandafter\expandafter\expandafter\xmp@Language
```


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```
706 \expandafter\expandafter\expandafter{%
707 \expandafter\xmp@Language\pdfx@insert@sep}%
708 \def\afterxmp@parse{%
709 \expandafter\expandafter\expandafter\gdef
710 \expandafter\expandafter\expandafter\xmp@Language
711 \expandafter\expandafter\expandafter{%
712 \expandafter\xmp@Language\xmp@extraLanguages}}%
713 \xmp@parse{\global\let\xmp@extraLanguages\@this}%
714 }%
715
716 \newcommand{\pdfx@extraContributor}[1][{}]{%
717 \ifx\relax#1\relax
718 \expandafter\expandafter\expandafter\gdef
719 \expandafter\expandafter\expandafter\xmp@Contributor
720 \expandafter\expandafter\expandafter{%
721 \expandafter\xmp@Contributor\pdfx@insert@sep}%
722 \else
723 \expandafter\expandafter\expandafter\gdef
724 \expandafter\expandafter\expandafter\xmp@Contributor
725 \expandafter\expandafter\expandafter{%
726 \expandafter\xmp@Contributor\pdfx@insert@sep[#1]}%
727 \fi
728 \def\afterxmp@parse{%
729 \expandafter\expandafter\expandafter\gdef
730 \expandafter\expandafter\expandafter\xmp@Contributor
731 \expandafter\expandafter\expandafter{%
732 \expandafter\xmp@Contributor\xmp@extraContributor}%
733 }%
734 \xmp@parse{\global\let\xmp@extraContributor\@this}%
735 }%
736
737 \newcommand{\pdfx@extraAuthoritativeDomain}{%
738 \expandafter\expandafter\expandafter\gdef
739 \expandafter\expandafter\expandafter\xmp@AuthoritativeDomain
740 \expandafter\expandafter\expandafter{%
741 \expandafter\xmp@AuthoritativeDomain\pdfx@insert@sep}%
742 \def\afterxmp@parse{%
743 \expandafter\expandafter\expandafter\gdef
744 \expandafter\expandafter\expandafter\xmp@AuthoritativeDomain
745 \expandafter\expandafter\expandafter{%
746 \expandafter\xmp@AuthoritativeDomain\xmp@extraAuthoritativeDomain}%
747 }%
748 \xmp@parse{\global\let\xmp@extraAuthoritativeDomain\@this}%
749 }%
750
751 \newcommand{\pdfx@extraDate}{%
752 \expandafter\expandafter\expandafter\gdef
753 \expandafter\expandafter\expandafter\xmp@Date
754 \expandafter\expandafter\expandafter{%
755 \expandafter\xmp@Date\pdfx@insert@sep}%
756 \def\afterxmp@parse{%
757 \expandafter\expandafter\expandafter\gdef
```

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```
758 \expandafter\expandafter\expandafter\xmp@Date
759 \expandafter\expandafter\expandafter{%
760 \expandafter\xmp@Date\xmp@extraDate}%
761 }%
762 \xmp@parse{\global\let\xmp@extraDate\@this}%
763 }%
764
765 \newcommand{\pdfx@extraRelation}[1][{}]{%
766 \ifx\relax#1\relax
767 \expandafter\expandafter\expandafter\gdef
768 \expandafter\expandafter\expandafter\xmp@Relation
769 \expandafter\expandafter\expandafter{%
770 \expandafter\xmp@Relation\pdfx@insert@sep}%
771 \else
772 \expandafter\expandafter\expandafter\gdef
773 \expandafter\expandafter\expandafter\xmp@Relation
774 \expandafter\expandafter\expandafter{%
775 \expandafter\xmp@Relation\pdfx@insert@sep[#1]}%
776 \fi
777 \def\afterxmp@parse{%
778 \expandafter\expandafter\expandafter\gdef
779 \expandafter\expandafter\expandafter\xmp@Relation
780 \expandafter\expandafter\expandafter{%
781 \expandafter\xmp@Relation\xmp@extraRelation}%
782 }%
783 \xmp@parse{\global\let\xmp@extraRelation\@this}%
784 }%
785
786 %%\newcommand{\pdfx@extraType}[1][{}]{%
787 %%\show\xmp@Type
788 %%\ifx\relax#1\relax
789 %%\expandafter\expandafter\expandafter\gdef
790 %%\expandafter\expandafter\expandafter\xmp@Type
791 %%\expandafter\expandafter\expandafter{%
792 %%\expandafter\xmp@Type\pdfx@insert@sep}%
793 %%\else
794 %%\expandafter\expandafter\expandafter\gdef
795 %%\expandafter\expandafter\expandafter\xmp@Type
796 %%\expandafter\expandafter\expandafter{%
797 %%\expandafter\xmp@Type\pdfx@insert@sep[#1]}%
798 %%\fi
799 %%\def\afterxmp@parse{%
800 %%\expandafter\expandafter\expandafter\gdef
801 %%\expandafter\expandafter\expandafter\xmp@Type
802 %%\expandafter\expandafter\expandafter{%
803 %%\expandafter\xmp@Type\xmp@extraType}%
804 %%\show\xmp@Type
805 %%}%
806 %%\xmp@parse{\global\let\xmp@extraType\@this}%
807 %%}%
808
809 \newcommand{\pdfx@extraAdvisory}[1][{}]{%
```

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```
810 \ifx\relax#1\relax
811   \expandafter\expandafter\expandafter\gdef
812     \expandafter\expandafter\expandafter\xmp@Advisory
813       \expandafter\expandafter\expandafter{%
814         \expandafter\xmp@Advisory\pdfx@insert@sep}%
815 \else
816   \expandafter\expandafter\expandafter\gdef
817     \expandafter\expandafter\expandafter\xmp@Advisory
818       \expandafter\expandafter\expandafter{%
819         \expandafter\xmp@Advisory\pdfx@insert@sep[#1]}%
820 \fi
821 \def\afterxmp@parse{%
822   \expandafter\expandafter\expandafter\gdef
823     \expandafter\expandafter\expandafter\xmp@Advisory
824       \expandafter\expandafter\expandafter{%
825         \expandafter\xmp@Advisory\xmp@extraAdvisory}%
826   }%
827 \xmp@parse{\global\let\xmp@extraAdvisory\@this}%
828 }%
829
830 \newcommand{\pdfx@extraIdentifier}[1][]{%
831   \ifx\relax#1\relax
832     \expandafter\expandafter\expandafter\gdef
833       \expandafter\expandafter\expandafter\xmp@Identifier
834         \expandafter\expandafter\expandafter{%
835           \expandafter\xmp@Identifier\pdfx@insert@sep}%
836   \else
837     \expandafter\expandafter\expandafter\gdef
838       \expandafter\expandafter\expandafter\xmp@Identifier
839         \expandafter\expandafter\expandafter{%
840           \expandafter\xmp@Identifier\pdfx@insert@sep[#1]}%
841   \fi
842   \def\afterxmp@parse{%
843     \expandafter\expandafter\expandafter\gdef
844       \expandafter\expandafter\expandafter\xmp@Identifier
845         \expandafter\expandafter\expandafter{%
846           \expandafter\xmp@Identifier\xmp@extraIdentifier}%
847     }%
848   \xmp@parse{\global\let\xmp@extraIdentifier\@this}%
849   }%
850
851 \newcommand{\pdfx@extraThumbnails}[1][]{%
852   \ifx\relax#1\relax
853     \expandafter\expandafter\expandafter\gdef
854       \expandafter\expandafter\expandafter\xmp@Thumbnails
855         \expandafter\expandafter\expandafter{%
856           \expandafter\xmp@Thumbnails\pdfx@insert@sep}%
857   \else
858     \expandafter\expandafter\expandafter\gdef
859       \expandafter\expandafter\expandafter\xmp@Thumbnails
860         \expandafter\expandafter\expandafter{%
861           \expandafter\xmp@Thumbnails\pdfx@insert@sep[#1]}%
```

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```
862 \fi
863 \def\afterxmp@parse{%
864   \expandafter\expandafter\expandafter\gdef
865     \expandafter\expandafter\expandafter\xmp@Thumbnails
866     \expandafter\expandafter\expandafter{%
867       \expandafter\xmp@Thumbnails\xmp@extraThumbnails}%
868   }%
869 \xmp@parse{\global\let\xmp@extraThumbnails\@this}%
870 }%
871
872 \newcommand{\pdfx@extraOwner}[1][{}]{%
873   \ifx\relax#1\relax
874     \expandafter\expandafter\expandafter\gdef
875       \expandafter\expandafter\expandafter\xmp@Owner
876       \expandafter\expandafter\expandafter{%
877         \expandafter\xmp@Owner\pdfx@insert@sep}%
878   \else
879     \expandafter\expandafter\expandafter\gdef
880       \expandafter\expandafter\expandafter\xmp@Owner
881       \expandafter\expandafter\expandafter{%
882         \expandafter\xmp@Owner\pdfx@insert@sep[#1]}%
883   \fi
884 \def\afterxmp@parse{%
885   \expandafter\expandafter\expandafter\gdef
886     \expandafter\expandafter\expandafter\xmp@Owner
887     \expandafter\expandafter\expandafter{%
888       \expandafter\xmp@Owner\xmp@extraOwner}%
889   }%
890 \xmp@parse{\global\let\xmp@extraOwner\@this}%
891 }%
892
893 \newcommand{\pdfx@Subject}[1][{}]{%
894   \ifx\relax#1\relax\else\gdef\xmp@lang@Subject{#1}\fi
895   \xmp@parse{\global\let\xmp@Subject\@this}}
896 \newcommand{\pdfx@Producer}[1][{}]{%
897   \ifx\relax#1\relax\else\gdef\xmp@lang@Producer{#1}\fi
898   \xmp@parse{\global\let\xmp@Producer\@this}}
899 \newcommand{\pdfx@Publisher}[1][{}]{%
900   \ifx\relax#1\relax\else\gdef\xmp@lang@Publisher{#1}\fi
901   \xmp@parse{\global\let\xmp@Publisher\@this}}
902 \newcommand{\pdfx@Copyright}[1][{}]{%
903   \ifx\relax#1\relax\else\gdef\xmp@lang@Copyright{#1}\fi
904   \xmp@parse{\global\let\xmp@Copyright\@this%
905     \ifx\xmp@Copyrighted\@empty\gdef\xmp@Copyrighted{True}\fi}}
906
907 \newcommand{\pdfx@Coverage}[1][{}]{%
908   \ifx\relax#1\relax\else\gdef\xmp@lang@Coverage{#1}\fi
909   \xmp@parse{\global\let\xmp@Coverage\@this}}
910
911 %% PRISM Text fields
912 \newcommand{\pdfx@CoverDisplayDate}[1][{}]{%
913   \ifx\relax#1\relax\else\gdef\xmp@lang@CoverDisplayDate{#1}\fi
```

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```
914 \xmp@parse{\global\let\xmp@CoverDisplayDate\@this}}
915 \newcommand{\pdfx@JournalTitle}[1][\{%
916 \ifx\relax#1\relax\else\gdef\xmp@lang@JournalTitle{#1}\fi
917 \ifx\xmp@PublicationType\empty\gdef\xmp@PublicationType{journal}\fi
918 \xmp@parse{\global\let\xmp@JournalTitle\@this}}
919
920 %% Uses PRISM Controlled Vocabulary:
921 %% http://prismstandard.org/vocabularies/3.0/aggregationtype.xml
922 %% blog, book, bookazine, catalog, feed, journal, magazine, manual
923 %% newsletter, newspaper, other, report, pamphlet, vook, whitepaper
924 %%
925 \newcommand{\pdfx@PublicationType}[1][\{%
926 \ifx\relax#1\relax\else\gdef\xmp@lang@PublicationType{#1}\fi
927 \xmp@parse{\global\let\xmp@PublicationType\@this}}
928
929 \def\pdfx@localcommands{
930 \let\Title\pdfx@Title
931 \let\Author\pdfx@Author
932 \let\Keywords\pdfx@Keywords
933 \let\Subject\pdfx@Subject
934 \let\Language\pdfx@Language
935 \def\CreatorTool{\xmp@parse{\global\let\xmp@CreatorTool\@this}}
936 \let\Producer\pdfx@Producer
937 \def\Volume{\xmp@parse{\global\let\xmp@Volume\@this}}
938 \def\Issue{\xmp@parse{\global\let\xmp@Issue\@this}}
939 \let\CoverDisplayDate\pdfx@CoverDisplayDate
940 \def\CoverDate{\xmp@parse{\global\let\xmp@CoverDate\@this}}
941 \let\Copyright\pdfx@Copyright
942 \def\CopyrightURL{\xmp@parse{\global\let\xmp@CopyrightURL\@this%
943 \ifx\xmp@Copyrighted\empty\gdef\xmp@Copyrighted{True}\fi}}
944 \def\Copyrighted{\xmp@parse{\global\let\xmp@Copyrighted\@this}}
945 \def\Doi{\xmp@parse{\global\let\xmp@Doi\@this}}
946 \def\ISBN{\xmp@parse{\global\let\xmp@ISBN\@this}}
947 \def\URLlink{\xmp@parse{\global\let\xmp@URL\@this}}
948 \def\Lastpage{\xmp@parse{\global\let\xmp@Lastpage\@this}}
949 \def\Firstpage{\xmp@parse{\global\let\xmp@Firstpage\@this}}
950 \let\PublicationType\pdfx@PublicationType
951 \let\Journaltitle\pdfx@JournalTitle
952 \def\Journalnumber{\xmp@parse{\global\let\xmp@Journalnumber\@this}}
953 \let\Publisher\pdfx@Publisher
954 \let\Coverage\pdfx@Coverage
955 \def\Source{\xmp@parse{\global\let\xmp@Source\@this}}
956 \let\Contributor\pdfx@Contributor
957 \let\Date\pdfx@Date
958 \let\Relation\pdfx@Relation
959 \let\Advisory\pdfx@Advisory
960 \def\BaseURL{\xmp@parse{\global\let\xmp@BaseURL\@this}}
961 \let\Identifier\pdfx@Identifier
962 \let\Nickname\pdfx@Nickname
963 \let\Thumbnails\pdfx@Thumbnails
964 \let\Owner\pdfx@Owner
965 \def\CertificateURL{\xmp@parse{\global\let\xmp@CertificateURL\@this}}
```

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```
966 \def\MMversionID{\xmp@parse{\global\let\xmpMM@versionID\@this}}
967 %% \let\Type\pdfx@Type
968 %%
969 %% currently unused; for backward compatibility only
970 \let\AuthoritativeDomain\pdfx@AuthoritativeDomain
971 \let\Creator\CreatorTool % for backward compatibility
972 \let\Org\Publisher % for backward compatibility
973 \let\WebStatement\CopyrightURL % for backward compatibility
974 }
975
976 %%-----
977 %% The following characters and markup can be used within the XMP data
978 %% defined by \Author, \Title, and so on.
979 %%
980 %% * All printable non-whitespace ASCII characters except
981 %% ' ', '{', '}', '\ ' can be used as themselves.
982 %%
983 %% * All printable non-whitespace UTF-8 encoded Unicode characters
984 %% from the basic multilingual plane can be used as themselves.
985 %%
986 %% * As usual, consecutive whitespace characters are contracted to a
987 %% single space. Whitespace after a macro such as \copyright is
988 %% ignored. Blank lines are not permitted.
989 %%
990 %% * The following markup can be used:
991 %% '\ ' - a literal space (for example after a macro)
992 %% \% - a literal '%'
993 %% \{ - a literal '{'
994 %% \} - a literal '}'
995 %% \backslash - a literal '\'
996 %% \copyright - the (c) copyright symbol
997 %%
998 %% \sep - only permitted within \Author, \Keywords, \Publisher.
999 %%
1000 %% * For backward compatibility, \& and \TextCopyright are also
1001 %% provided. Their use is deprecated.
1002
1003 %%-----
1004 %% The macro \pdfx@actives binds the active characters
1005 %% '&', '<', and '>' to \pdfx@amp, \pdfx@lt, and \pdfx@gt,
1006 %% respectively, without actually making them active.
1007 \begingroup
1008 \catcode'\<=13
1009 \catcode'\>=13
1010 \catcode'\&=13
1011 \gdef\pdfx@actives{
1012 \def&{\pdfx@amp}
1013 \def<{\pdfx@lt}
1014 \def>{\pdfx@gt}
1015 }
1016 \endgroup
1017
```


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```
1018 %%-----
1019 %% Markup bindings to be used during XMP generation.
1020
1021 {%
1022   \catcode'\<=12 \catcode'\>=12 \catcode'\/=12 \catcode'\:=12 \catcode\'\"=12
1023   \obeyspaces\ifpdfx@useactivespaces%
1024   \gdef\pdfx@sep {\pdfx@check@lang}%
1025   \else%
1026     \gdef\pdfx@sep{\pdfx@check@lang}%
1027   \fi%
1028   \xdef\pdfx@sep@nolang{</rdf:li>^^J      <rdf:li>}%
1029   \xdef\pdfx@sep@lang[#1]{</rdf:li>^^J      <rdf:li xml:lang=\"#1\">}%
1030 }% end of \obeyspaces and \catcode ....
1031
1032 \def\pdfx@check@lang#1{%
1033   \ifx[#1\expandafter\@firstoftwo
1034   \else\expandafter\@secondoftwo\fi
1035   {\pdfx@sep@lang#1}{\pdfx@sep@nolang#1}}
1036
1037 \def\pdfx@xmpmarkup{%
1038   \pdfx@actives
1039   \edef\@amp{\expandafter\@gobble\string\&}%
1040   \edef\@hash{\expandafter\@gobble\string\#}%
1041   \edef\ { \expandafter\@gobble\string\ }%
1042   \edef\%{\expandafter\@gobble\string\}%
1043   \edef\{{\expandafter\@gobble\string\{}%
1044   \edef\}{\expandafter\@gobble\string\}%
1045   \edef\backslash{\expandafter\@gobble\string\\}%
1046   \def\@unicode##1{\@amp\@hash x##1;}%
1047   \def\pdfx@amp{\@unicode{0026}}%
1048   \def\pdfx@lt{\@unicode{003c}}%
1049   \def\pdfx@gt{\@unicode{003e}}%
1050   \def\copyright{\@unicode{00A9}}%
1051   \let\&\pdfx@amp          % for backward compatibility
1052   \let\TextCopyright\copyright % for backward compatibility
1053   \let\sep\pdfx@sep
1054   \pdfx@xmpunimarkup      % only need this when writing XMP
1055   \the\pdfxsafeforxmp@toks
1056 }
1057
1058 %% cope with active spaces with LGR encoding
1059 %% and the spaces written out with \IeC in KOI8-r
1060 %% It's possible to have both together.
1061 \def\liixu@IeC#1#{\liixu@IeCi}
1062 \def\liixu@IeCi#1{\liixu@IeCii#1}
1063 \def\liixu@IeCii#1#2{#1}
1064 \def\liixu@enableIeC{\ifpdfx@useactivespaces
1065   \let\IeC\liixu@IeC\else\def\IeC##1{##1}\fi}
1066 \def\liixu@numberline#1#{\liixu@numberlinei}
1067 \def\liixu@numberlinei#1{\liixu@numberlineii#1}
1068 \def\liixu@numberlineii#1{\textLF #1. }
1069 \def\liixu@enablenumberline{\ifpdfx@useactivespaces
```

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```
1070 \let\numberline\liixu@numberline
1071 \else\def\numberline##1{\textLF ##1. }\fi}
1072
1073 \def\pdfx@xmpunimarkup{%
1074 \liixu@enableIeC
1075 \liixu@enablenumberline
1076 \def\empty{}% used in LICR patterns
1077 \LIIXUscriptcommands
1078 \LIIXUtipacommands
1079 \LIIXUmapTeXnames
1080 %% from Hyperref's psdextra.def
1081 \csname psdmapshortnames\endcsname
1082 \csname psdaliasnames\endcsname
1083 %% from lu8enc.def
1084 \csname LIIXUmapmathletterlikes\endcsname
1085 \csname LIIXUmapmathspaces\endcsname
1086 \iflatLATxmp
1087 \LIIXUmaplatinchars
1088 \LIIXUcancelfontswitches
1089 \fi
1090 \ifmathxmp
1091 \let\(\textinlinemath
1092 \let\[ \textdisplaymath
1093 \LIIXUmapmathaccents
1094 \LIIXUmapisomathgreek
1095 \LIIXUmapmatharrowsA
1096 \LIIXUmapmathoperatorsA
1097 \LIIXUmapmathoperatorsB
1098 \LIIXUmapmiscmathsymbolsA
1099 \LIIXUmapsupparrowsA
1100 \LIIXUmapsupparrowsB
1101 \LIIXUmapmiscmathsymbolsB
1102 \LIIXUmapsuppmathoperators
1103 \LIIXUmapunimathgreek
1104 \LIIXUmapmathalphabets
1105 \fi
1106 \ifarbxmp \LIIXUmaparabicletters\fi
1107 \ifarmxmp \LIIXUmaparmenianletters\fi
1108 \ifdevxmp \LIIXUmapdevaccents\fi
1109 \ifgrkxmp \LIIXUmapgreekletters\fi
1110 \ifhebxmp \LIIXUmaphebrewletters\fi
1111 }
1112
1113 %% In case macros are used in XMP Metadata, need a way to map these
1114 %% to simple text, rather than specific font characters, or whatever:
1115 \newtoks\pdfxsafeorxmp@toks
1116 \def\pdfxEnableCommands{% user command
1117 \begingroup
1118 \ifpdfx@useactivespaces\obeyspaces\fi
1119 \pdfx@EnableCommands
1120 }
1121 \def\pdfx@EnableCommands#1{% internal command
```

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```
1122 \expandafter\global\expandafter\pdfxsafeformp@toks
1123 \expandafter{\the\pdfxsafeformp@toks#1}%
1124 \endgroup
1125 }
1126
1127 %%-----
1128 %% Markup bindings to be used during PDF string generation.
1129
1130 \def\pdfx@pdfmarkup{%
1131 \pdfx@actives
1132 \edef%\expandafter\@gobble\string\%%
1133 \edef\{\expandafter\@gobble\string\}%
1134 \edef\}\expandafter\@gobble\string\}%
1135 \edef\pdfx@backslash\expandafter\@gobble\string\}%
1136 \def\backslash\pdfx@backslash000\pdfx@backslash134}%
1137 \edef\pdfx@amp\expandafter\@gobble\string\&%
1138 \edef\pdfx@lt\expandafter\@gobble\string\<%
1139 \edef\pdfx@gt\expandafter\@gobble\string\>%
1140 \let\TextCopyright\copyright % for backward compatibility
1141 \def\sep{; }%
1142 %\let\sep\pdfx@sep
1143 %% Note: '\ ', \&, \copyright are already predefined by hyperref.
1144 %% allow LICRs to expand into PDF strings
1145 \def\cf@encoding{PU}%
1146 \def\9##1{\ifcase##1\string\0\or\string\1\or\string\2\or\string\3\fi}%
1147 \def\8{\string\00}%
1148 \def\0{\string\0}\def\1{\string\1}\def\2{\string\2}\def\3{\string\3}%
1149 \pdfx@xmpunimarkup
1150 \the\pdfxsafeformp@toks
1151 }
1152
1153 %%-----
1154 %% Defaults
1155 \ifxetex
1156 \def\xmp@Producer{XeTeX}
1157 \else\ifluatex
1158 \def\xmp@Producer{LuaTeX}
1159 \else
1160 \def\xmp@Producer{pdfTeX}
1161 \fi\fi
1162 \global\let\pdfxProducer\xmp@Producer
1163
1164 \global\let\xmp@CreatorTool\@empty
1165 \global\let\xmp@Title\@empty
1166 \global\let\xmp@Author\@empty
1167 \global\let\xmp@Keywords\@empty
1168 \global\let\xmp@Subject\@empty
1169 \global\let\xmp@Language\@empty
1170 \global\let\xmp@Volume\@empty
1171 \global\let\xmp@Issue\@empty
1172 \global\let\xmp@CoverDisplayDate\@empty
1173 \global\let\xmp@CoverDate\@empty
```

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```
1174 \global\let\xmp@Copyright\@empty
1175 \global\let\xmp@Copyrighted\@empty
1176 \global\let\xmp@CopyrightURL\@empty
1177 \gdef\xmp@WebStatement{\xmp@CopyrightURL}
1178 \global\let\xmp@Doi\@empty
1179 \global\let\xmp@ISBN\@empty
1180 \global\let\xmp@URL\@empty
1181 \global\let\xmp@Lastpage\@empty
1182 \global\let\xmp@Firstpage\@empty
1183 \global\let\xmp@PublicationType\@empty
1184 \global\let\xmp@Journaltitle\@empty
1185 \global\let\xmp@Journalnumber\@empty
1186 %%\global\let\xmp@Type\@empty
1187 \global\let\xmp@Contributor\@empty
1188 \global\let\xmp@Coverage\@empty
1189 \global\let\xmp@Date\@empty
1190 \global\let\xmp@Relation\@empty
1191 \global\let\xmp@Source\@empty
1192 \global\let\xmp@Publisher\@empty
1193 \gdef\xmp@Org{\xmp@Publisher}
1194 \global\let\xmp@AuthoritativeDomain\@empty
1195 \global\let\xmp@Advisory\@empty
1196 \global\let\xmp@BaseURL\@empty
1197 \global\let\xmp@Identifier\@empty
1198 \global\let\xmp@Nickname\@empty
1199 \global\let\xmp@Thumbnails\@empty
1200 \global\let\xmp@Owner\@empty
1201 \global\let\xmp@CertificateURL\@empty
1202
1203 %%-----
1204 %% Alternative way to get the CreationDate using Lua for XeTeX
1205 \ifdefined\pdfcreationdate\else
1206 \begingroup %% ensure correct catcodes, not done by \dospecials
1207 \catcode'\:=12 \catcode'\.=12
1208 \begin{filecontents*}{creationdate.lua}
1209 os.remove("creationdate.timestamp")
1210 io.output("creationdate.timestamp"):write(os.date("\edef\\tempa{\\string D:%Y%m%d%H%M%S}\\n\\
1211 \end{filecontents*}
1212 \endgroup
1213 \ifnum\shellescape=1
1214 \begingroup %% ensure correct catcodes when file is read in
1215 \catcode'\=12 \catcode'\.=12 \catcode'\:=12 \catcode'\+=12
1216 \immediate\write18{texlua creationdate.lua}
1217 \input{creationdate.timestamp}
1218 \def\tempc#1#2#3#4#5{#1#2#3'#4#5'}
1219 \edef\tempb{\expandafter\tempc\tempb}
1220 \edef\x{\endgroup\def\noexpand\pdfcreationdate{\tempa\tempb}}\x
1221 \else
1222 \begingroup %% ensure correct catcodes in the error/warning messages
1223 \catcode'\<=12 \catcode'\>=12 \catcode\'"=12 \catcode'\-=12
1224 \catcode'\: 12 \catcode\' ' 12 \catcode\'= 12
1225 \ifpdfx@noerr
```

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```
1226 \PackageWarning{pdfx}{%
1227   CreationDate is not properly supported;^^J
1228   PDF validation may fail. To avoid this problem use:^^J
1229     xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename>^^J}
1230 \else
1231 \PackageError{pdfx}{%
1232   CreationDate is not properly supported;^^J
1233   PDF validation may fail.}{To avoid this problem use:^^J
1234     xelatex -shell-escape -output-driver="xdvipdfmx -z 0" <filename> }
1235 \fi
1236 %% Using a constant date, to allow processing to finish smoothly.
1237 \edef\x{\endgroup
1238   \def\noexpand\pdfcreationdate{\string D:20181028075445+10'00'}}%
1239 \x
1240 \fi
1241 \fi
1242
1243 %%-----
1244 \def\pdfx@findUUID#1{\edef\pdfx@tmpstring{\pdfx@mdfivesum{#1}}
1245   \expandafter\pdfx@eightofnine\pdfx@tmpstring\end}
1246 \def\pdfx@eightofnine#1#2#3#4#5#6#7#8#9\end{%
1247   \xdef\pdfx@eightchars{#1#2#3#4#5#6#7#8}
1248   \pdfx@fouroffive#9\end}
1249 \def\pdfx@fouroffive#1#2#3#4#5\end{\xdef\pdfx@ffourchars{#1#2#3#4}
1250   \pdfx@sfouroffive#5\end}
1251 \def\pdfx@sfouroffive#1#2#3#4#5\end{\xdef\pdfx@sfourchars{#1#2#3#4}
1252   \pdfx@tfouroffive#5\end}
1253 \def\pdfx@tfouroffive#1#2#3#4#5\end{\xdef\pdfx@tfourchars{#1#2#3#4}
1254   \xdef\pdfx@laststring{#5}}
1255
1256 \def\pdfx@uuid{\pdfx@eightchars-%
1257   \pdfx@ffourchars-%
1258   \pdfx@sfourchars-%
1259   \pdfx@tfourchars-%
1260   \pdfx@laststring}
1261
1262 \expandafter\ifx\csname pdfx@mdfivesum\endcsname\relax
1263 \PackageError{pdfx}{%
1264   No implementation for \string\pdfx@mdfivesum.^^J
1265   \ifxetex XeTeX needs to be 2015 or later\fi
1266 }{%
1267   Continue without, but the PDF will not validate.
1268 }%
1269 \def\xmp@docid{%
1270 \def\pdfx@findUUID#1{%
1271 \def\pdfx@uuid{%
1272 \else
1273 \pdfx@findUUID{\jobname.pdf}
1274 \edef\xmp@docid{\pdfx@uuid}
1275 \fi
1276
1277 \expandafter\ifx\csname pdfcreationdate\endcsname\relax\relax
```

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```
1278 \PackageWarning{pdfx}{%
1279   No implementation for \string\pdfxcreation .
1280 }%
1281 \def\xmp@instid{%
1282 %%
1283 \else %% use the MD5 sum methods
1284 %%
1285 \pdfx@findUUID{\pdfcreationdate}%
1286 \edef\xmp@instid{\pdfx@uuid}
1287 \fi
1288
1289 %%-----
1290 %% load xcolor before hyperref to get the link colors correct
1291 %%
1292 \PassOptionsToPackage{nosetpagesize}{color}
1293 \PassOptionsToPackage{nosetpagesize}{graphics}
1294 \ifpackageloaded{xcolor}{%
1295   % Beamer will have already loaded xcolor
1296   % need to understand what options it used
1297 }{
1298 \ifpdfx@x
1299   \RequirePackage{cmyk,hyperref}{xcolor}
1300 \else
1301   \RequirePackage{rgb,hyperref}{xcolor}
1302 \fi
1303 }%
1304
1305 %% loading puenc.def will kill a lot of what mathtext.sty established
1306 \ifpackageloaded{mathtext}{%
1307   \PackageWarningNoLine{pdfx}{pdfx.sty and hyperref.sty should be loaded^^J
1308     before mathtext.sty , otherwise text symbols may not show in math mode.}%
1309 }{}
1310
1311 \newif\ifpdfx@hluatex
1312 \IfFileExists{hluatex.def}{\pdfx@hluatextrue}{\pdfx@hluatexfalse}
1313
1314 %% the "pdftex" option seems to work fine with LuaTeX
1315 \def\pdfx@luatex{\ifpdfx@hluatex luatex\else pdftex \fi}
1316
1317 %% Hyperref options for PDF/X
1318 \edef\pdfx@pdfX@opts@pdftex{%
1319   draft,pdftex,pdfpagemode=UseNone,bookmarks=false,%
1320   pdfversion=1.\thepdfminorversion,pdfstartview=}
1321 \edef\pdfx@pdfX@opts@xetex{%
1322   draft,xetex,pdfpagemode=UseNone,bookmarks=false,%
1323   pdfversion=1.\thepdfminorversion,pdfstartview=}
1324 \edef\pdfx@pdfX@opts@luatex{%
1325   draft,\pdfx@luatex,pdfpagemode=UseNone,bookmarks=false,%
1326   pdfversion=1.\thepdfminorversion,pdfstartview=}%
1327
1328 \newif\ifpdfx@hyperrefloaded
1329 \expandafter\ifx\csname ifHy@pdfa\endcsname\relax\else\pdfx@hyperrefloadedtrue\fi
```


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```
1330
1331 %% Hyperref options for PDF/A and PDF/E
1332 \newtoks\pdfx@tmp toks
1333 \pdfx@tmp toks{%
1334 \ifHy@pdfa
1335   \edef\pdfx@pdfAE@opts@pdftex{pdftex}%
1336   \edef\pdfx@pdfAE@opts@xetex{xetex,pdfversion=1.\thepdfminorversion}%
1337   \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatex,pdfversion=1.\thepdfminorversion}%
1338   \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfversion=1.\thepdfminorversion}%
1339 \else
1340   \edef\pdfx@pdfAE@opts@pdftex{pdftex,pdfa}%
1341   \edef\pdfx@pdfAE@opts@xetex{xetex,pdfa,pdfversion=1.\thepdfminorversion}%
1342   \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatex,pdfa,pdfversion=1.\thepdfminorversion}%
1343   \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfa,pdfversion=1.\thepdfminorversion}%
1344 \fi
1345 }
1346 \ifpdfx@hyperrefloaded
1347 \the\pdfx@tmp toks\relax
1348 \else
1349   \edef\pdfx@pdfAE@opts@pdftex{pdftex,pdfa}%
1350   \edef\pdfx@pdfAE@opts@xetex{xetex,pdfa,pdfversion=1.\thepdfminorversion}%
1351   \edef\pdfx@pdfAE@opts@luatex{\pdfx@luatex,pdfa,pdfversion=1.\thepdfminorversion}%
1352   \edef\pdfx@pdfAE@opts@pdfmark{pdfmark,pdfa,pdfversion=1.\thepdfminorversion}%
1353 \fi
1354 \pdfx@tmp toks}%
1355
1356 \ifpdfx@x
1357 \@ifpackageloaded{hyperref}{%
1358   \ifxetex
1359     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@xetex}
1360   \else\ifluatex
1361     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@luatex}
1362   \else
1363     \expandafter\hypersetup\expandafter{\pdfx@pdfX@opts@pdftex}
1364   \fi\fi
1365 }{%
1366   \ifxetex
1367     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@xetex]{hyperref}
1368   \else\ifluatex
1369     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@luatex]{hyperref}
1370   \else
1371     \expandafter\RequirePackage\expandafter[\pdfx@pdfX@opts@pdftex]{hyperref}
1372   \fi\fi
1373 }%
1374 \else
1375 \ifpdfx@e
1376 \@ifpackageloaded{hyperref}{%
1377   \ifxetex
1378     \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@xetex}
1379   \else\ifluatex
1380     \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@luatex}
1381   \else
```

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```
1382 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@pdftex}
1383 \fi\fi
1384 }{%
1385 \ifxetex
1386 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@xetex]{hyperref}
1387 \else\ifluatex
1388 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@luatex]{hyperref}
1389 \else
1390 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@pdftex]{hyperref}
1391 \fi\fi
1392 }%
1393 \else % generating PDF/A or ...
1394 \@ifpackageloaded{hyperref}{%
1395 \ifxetex
1396 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@xetex}%
1397 \else\ifluatex
1398 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@luatex}%
1399 \else
1400 \expandafter\hypersetup\expandafter{\pdfx@pdfAE@opts@pdftex}%
1401 \fi\fi
1402 }{%
1403 \ifxetex
1404 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@xetex]{hyperref}
1405 \else\ifluatex
1406 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@luatex]{hyperref}
1407 \else
1408 \expandafter\RequirePackage\expandafter[\pdfx@pdfAE@opts@pdftex]{hyperref}
1409 \fi\fi
1410 }%
1411 \fi\fi
1412 \hypersetup{pdfencoding=auto}% unicode
1413 \expandafter\ifx\csname KV@Hyp@psdextra\endcsname\relax\else
1414 \hypersetup{psdextra}
1415 \fi
1416
1417 %% hyperref doesn't set the minor version for XeTeX
1418 \ifxetex
1419 \special{pdf:minorversion \thepdfminorversion}
1420 \fi
1421
1422 \ifx\xmp@CreatorTool\@empty
1423 \edef\xmp@CreatorTool{\@pdfcreator}
1424 \fi
1425
1426 \newif\ifpdfx@cmyk
1427 \newif\ifpdfx@custom
1428 \ifpdfx@x % PDF/X normally needs a CMYK color profile for printing
1429 \global\pdfx@cmyktrue
1430 \fi
1431 %%-----
1432 %% ----- Color Profiles -----
1433 %% Define how to specify the profile, so the default
```

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```
1434 %% can be over-ridden in the .xmpdata file.
1435 %%
1436 %% --- user-command --- RGB profile needed with PDF/A-??
1437 %% \setRGBcolorprofile{<filename>}{<identifier>}
1438 %% {<info string>}{<registry URL>}
1439 \def\setRGBcolorprofile{%
1440 \begingroup
1441 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1442 \catcode'\% 11\relax
1443 \edef\({\string\}\edef\){\string\})%
1444 \pdfx@setrgbprofile}
1445 %%
1446 %% --- user-command --- CMYK profile needed with PDF/X-??
1447 %% \setCMYKcolorprofile{<filename>}{<output intent>}
1448 %% {<identifier>}{<registry URL>}
1449 \def\setCMYKcolorprofile{%
1450 \begingroup
1451 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1452 \catcode'\% 11\relax
1453 \edef\({\string\}\edef\){\string\})%
1454 \pdfx@setcmykprofile}
1455 %%
1456 %% --- user-command --- DeviceGray profile needed with PDF/E-1
1457 %% \setGRAYcolorprofile{<filename>}{<output intent>}
1458 %% {<identifier>}{<registry URL>}
1459 \def\setGRAYcolorprofile{%
1460 \begingroup
1461 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1462 \catcode'\% 11\relax
1463 \edef\({\string\}\edef\){\string\})%
1464 \pdfx@setgrayprofile}
1465 %%
1466 %% --- user-command --- External profile with PDF/X-4p and PDF/X-5pg
1467 %% \setEXTERNALprofile{<profilename>}{<output intent>}
1468 %% {<identifier>}{<registry URL>}{<color-space>}%
1469 %% {<ICC Version>}{<provider URL>}{<extra info>}{<Check Sum>}
1470 \def\setEXTERNALprofile{%
1471 \begingroup
1472 \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1473 \catcode'\% 11\relax
1474 \edef\({\string\}\edef\){\string\})%
1475 \ifno@iccprofile
1476 \expandafter\pdfx@externalprofile
1477 \else
1478 \expandafter\pdfx@externalprofile@gobble
1479 \fi
1480 }
1481 %%
1482 %%
1483 \def\pdfx@setRGBcolorprofile#1{%
1484 \xdef\pdfx@RGBcolorprofiledir{#1}%
1485 }
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1486 \def\pdfx@setCMYKcolorprofiledir#1{%
1487   \xdef\pdfx@CMYKcolorprofiledir{#1}%
1488 }
1489 \pdfx@setRGBcolorprofiledir{}
1490 \pdfx@setCMYKcolorprofiledir{}
1491
1492 %% This does indeed work! Use it in .xmpdata files
1493 \providecommand{\MacOSColordir}{/System/Library/ColorSync/Profiles/}
1494 \providecommand{\MacOSLibraryColordir}{/Library/ColorSync/Profiles/}
1495 \providecommand{\AdobeMacOSdir}%
1496   {/Library/Application Support/Adobe/Color/Profiles/Recommended/}
1497 \edef\pdfx@tmp{C:\string\Windows\string\System32\string\Spool%
1498   \string\Drivers\string\Color\string/}
1499 \expandafter\providecommand\expandafter
1500   {\expandafter\WindowsColordir\expandafter}\expandafter{\pdfx@tmp}
1501 %%\pdfx@setcolorprofiledir{\AdobeMacOSdir}
1502
1503 %% override that value using the following commands:
1504 \let\pdfxSetCMYKcolorProfileDir\pdfx@setCMYKcolorprofiledir
1505 \let\pdfxSetRGBcolorProfileDir\pdfx@setRGBcolorprofiledir
1506 %% for back-compatibility
1507 \let\pdfxSetColorProfileDir\pdfxSetCMYKcolorProfileDir
1508 %%
1509 \def\pdfx@setrgbprofile#1#2#3#4{%
1510   \xdef\pdfx@rgb@profile{\pdfx@RGBcolorprofiledir#1}% valid file path/name
1511   \xdef\pdfx@rgb@profilename{#1}% valid file name
1512   \gdef\pdfx@rgb@identifier{#2}%
1513   \gdef\pdfx@rgb@info{#3}%
1514   \pdfstringdef\pdfx@rgb@registry{#4}% valid URL
1515   \endgroup
1516   \global\pdfx@cmykfalse
1517 }% closes-off \setRGBcolorprofile
1518 %%
1519 \def\pdfx@setcmykprofile#1#2#3#4{%
1520   \xdef\pdfx@cmyk@profile{\pdfx@CMYKcolorprofiledir#1}% valid file path/name
1521   \xdef\pdfx@cmyk@profilename{#1}% valid file name
1522   %% \expandafter\gdef\expandafter\pdfx@cmyk@profile\expandafter
1523   %%   {\pdfx@colorprofiledir#1}% valid file name
1524   \gdef\pdfx@cmyk@intent{#2}%
1525   %% \pdfstringdef\pdfx@cmyk@intent{#2}% color intent
1526   \gdef\pdfx@cmyk@identifier{#3}%
1527   %% \pdfstringdef\pdfx@cmyk@identifier{#3}% text string identifier
1528   \gdef\pdfx@cmyk@registry{#4}%
1529   %% \pdfstringdef\pdfx@cmyk@registry{#4}% valid URL
1530   \endgroup
1531   \global\pdfx@cmyktrue
1532 }% closes-off \setcmykcolorprofile
1533 %%
1534 \def\setCUSTOMcolorprofile{%
1535   \begingroup
1536   \catcode'\_ 11\relax\catcode'\& 11\relax\catcode'\~ 11\relax
1537   \catcode'\% 11\relax
```

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```
1538 \edef\{\string\{}\edef\{\string\})%
1539 \pdfx@setcustomprofile
1540 }
1541 \def\pdfx@setcustomprofile#1#2#3#4#5#6#7#8{%
1542 \xdef\pdfx@customcolorprofiledir{#2}% valid directory location
1543 \xdef\pdfx@custom@profile{#1}% valid file name
1544 \gdef\pdfx@custom@identifier{#3}%
1545 \gdef\pdfx@custom@registry{#4}%
1546 \gdef\pdfx@custom@numcolors{#5}% num-colors specifier
1547 \gdef\pdfx@iccversion{#6}% Hex string for /ICCVersion < ... >
1548 \gdef\pdfx@custom@colornames{#7}%
1549 \gdef\pdfx@profile@checksum{#8}% Hex string for /Checksum < ... >
1550 \endgroup
1551 \global\pdfx@cmykfalse
1552 \global\pdfx@customtrue
1553 }% closes-off \pdfx@setcustomprofile
1554 %%
1555 \def\pdfx@setgrayprofile#1#2#3#4{%
1556 \gdef\pdfx@gray@profile{#1}% valid file name
1557 \gdef\pdfx@gray@intent{#2}%
1558 \gdef\pdfx@gray@identifier{#3}%
1559 \pdfstringdef\pdfx@gray@registry{#4}% valid URL
1560 \endgroup}% closes-off \setGRAYcolorprofile
1561 %%
1562 \def\pdfx@externalprofile#1#2#3#4#5#6#7#8#9{%
1563 \gdef\pdfx@extprofile{#1}% PDF string for /ProfileName
1564 \gdef\pdfx@cmyk@intent{#2}% PDF string for /OutputCondition
1565 \gdef\pdfx@cmyk@identifier{#3}% PDF string for /OutputConditionIdentifier
1566 \gdef\pdfx@cmyk@registry{#4}% {http://www.color.org}%
1567 \gdef\pdfx@profileCS{#5}% 4 bytes for /ProfileCS
1568 \gdef\pdfx@iccversion{#6}% Hex string for /ICCVersion < ... >
1569 \gdef\pdfx@colorURL{#7}% URL
1570 \gdef\pdfx@cmyk@info{#8}% for /Info
1571 \gdef\pdfx@profile@checksum{#9}% Hex string for /Checksum < ... >
1572 \endgroup}% closes-off \setEXTERNALprofile
1573 \def\pdfx@externalprofile@gobble#1#2#3#4#5#6#7#8#9{%
1574 \PackageError{pdfx}{Wrong option for using an External Color profile}%
1575 {Use one of the options: x-4p , x-4p08 , x-4p10 or x-5pg .}%
1576 \endgroup}
1577 %%
1578 %% default color profiles
1579
1580 {\catcode'\_ 12 \catcode'\& 12 \catcode'\~ 12
1581 \gdef\pdfx@xprofile@cmykdefault{coated_FOGRA39L_arg1.icc}
1582 \gdef\pdfx@aprofile@rgbdefault{sRGB_IEC61966-2-1_black_scaled.icc}
1583 \gdef\pdfx@eprofile@graydefault{Gray_linear.icc}
1584 \gdef\pdfx@pprofile@externaldefault{FOGRA39}
1585 }% end of \catcode
1586 \xdef\pdfx@rgb@profile{\pdfx@aprofile@rgbdefault}
1587 \xdef\pdfx@cmyk@profile{\pdfx@xprofile@cmykdefault}
1588 \xdef\pdfx@gray@profile{\pdfx@eprofile@graydefault}
1589 \xdef\pdfx@external@profile{\pdfx@pprofile@externaldefault}
```

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```
1590
1591 %%-----
1592 %% License for the file  sRGB_IEC61966-2-1_black_scaled.icc :
1593 %%
1594 %% Copyright International Color Consortium, 2009  -- http://www.color.org/
1595 %%
1596 %% It is hereby acknowledged that the file "sRGB_IEC61966-2-1_black_scaled.icc"
1597 %% is provided "AS IS" WITH NO EXPRESS OR IMPLIED WARRANTY.
1598 %%
1599 %% Licensing
1600 %%
1601 %% This profile is made available by the International Color Consortium,
1602 %% and may be copied, distributed, embedded, made, used, and sold without
1603 %% restriction. Altered versions of this profile shall have the original
1604 %% identification and copyright information removed and shall not be
1605 %% misrepresented as the original profile.
1606 %%
1607 %% Terms of use
1608 %%
1609 %% To anyone who acknowledges that the file "sRGB_IEC61966-2-1_black_scaled.icc"
1610 %% is provided "AS IS" WITH NO EXPRESS OR IMPLIED WARRANTY, permission to use,
1611 %% copy and distribute these file for any purpose is hereby granted without fee,
1612 %% provided that the file is not changed including the ICC copyright notice tag,
1613 %% and that the name of ICC shall not be used in advertising or publicity
1614 %% pertaining to distribution of the software without specific, written prior
1615 %% permission. ICC makes no representations about the suitability of this
1616 %% software for any purpose.
1617 %%
1618 %%-----
1619
1620 \newif\ifpdfx@tryoldprofiles
1621
1622 %% The  colorprofiles package was added to  TeXLive  in October 2018.
1623 %% It allows the default Color Profiles to be maintained independent
1624 %% of the  pdfx  package.
1625 %% In particular  sRGB_IEC61966-2-1_black_scaled.icc  is no longer
1626 %% distributed with TeXLive 2018 and later.
1627 %% Older versions still have this file.
1628 %%
1629 \IfFileExists{colorprofiles.tex}{%
1630   \RequirePackage{colorprofiles}[2018/11/01]%
1631   \ifx\colorpro@rgb@profile\relax
1632     \expandafter\pdfx@tryoldprofilestrue
1633   \else
1634     \begingroup %% \endgroup occurs within the macro expansion
1635       \pdfx@setrgbprofile{\colorpro@rgb@profile
1636         }\colorpro@rgb@identifier
1637         }\colorpro@rgb@info
1638         }\colorpro@rgb@registry
1639       }%
1640     \begingroup %% \endgroup occurs within the macro expansion
1641     \pdfx@setcmykprofile{\colorpro@cmyk@profile
```


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```
1642     }\colorpro@cmky@intent
1643     }\colorpro@cmky@identifier
1644     }\colorpro@cmky@registry
1645     }%
1646     \expandafter\pdfx@tryoldprofilesfalse
1647     \fi
1648 }\pdfx@tryoldprofilestrue}
1649
1650 {\catcode'\ 14 \catcode'\% 12 \catcode'\_ 12 \catcode'\: 12
1651  \catcode'\. 12 \catcode'\- 12 \catcode'\ / 12
1652  \edef\@bchar{\expandafter\@gobble\string\}|
1653  \edef\({\string\}\edef\){\string\}}|
1654 \ifpdfx@tryoldprofiles
1655 || this will be used by TeXLive installations up to 2017.
1656 \begingroup | \endgroup occurs within the macro expansion
1657 \expandafter\pdfx@setrgbprofile\expandafter
1658 {sRGB_IEC61966-2-1_black_scaled.icc}|
1659 {sRGB_IEC61966-2-1_black_scaled}|
1660 {sRGB IEC61966 v2.1 with black scaling}|
1661 {http://www.color.org}|
1662 \begingroup | \endgroup occurs within the macro expansion
1663 \pdfx@setcmkyprofile{coated_FOGRA39L_argl.icc}| coated_FOGRA39L_argl.icc
1664 {Coated FOGRA39}|
1665 {FOGRA39 \string\ (ISO Coated v2 300%\space \string\ (ECI\string\)\string\)}|
1666 {http://www.argyllcms.com/}|{http://www.color.org}|
1667 \fi || end of \ifpdfx@tryoldprofiles
1668 \begingroup | \endgroup occurs within the macro expansion
1669 \pdfx@setgrayprofile{Gray_linear.icc}|
1670 {}|
1671 {Custom}|
1672 {http://www.freedesktop.org/wiki/OpenIcc}|
1673 \ifno@iccprofile
1674 \begingroup | \endgroup occurs within the macro expansion
1675 \pdfx@externalprofile{Coated FOGRA39 \ (ISO 12647-2:2004\)}|
1676 {Offset commercial and specialty printing according to ISO 12647-2:2004 |
1677 / Amd 1, paper type 1 or 2 \ (gloss or matte coated offset, 115 g/m2), |
1678 screen frequency 60/cm.}|
1679 {FOGRA39}{http://www.color.org}{CMYK}{02100000}{http://www.adobe.com}|
1680 {Coated FOGRA39 \ (ISO 12647-2:2004\)}{74FF62F330BF0DBE4495B5720542D511}|
1681 \fi
1682 }% end of \catcode
1683
1684 %%
1685 %%-----
1686 %% License for the file coated_FOGRA39L_argl.icc :
1687 %%
1688 %% The zlib/libpng License
1689 %%
1690 %% Copyright (c) 2008 Kai-Uwe Behrmann
1691 %%
1692 %% This software is provided 'as-is', without any express or implied
1693 %% warranty. In no event will the authors be held liable for any damages
```

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C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1694 %% arising from the use of this software.
1695 %%
1696 %% Permission is granted to anyone to use this software for any purpose,
1697 %% including commercial applications, and to alter it and redistribute
1698 %% it freely, subject to the following restrictions:
1699 %%
1700 %% 1. The origin of this software must not be misrepresented; you
1701 %% must not claim that you wrote the original software. If you use
1702 %% this software in a product, an acknowledgment in the product
1703 %% documentation would be appreciated but is not required.
1704 %%
1705 %% 2. Altered source versions must be plainly marked as such, and
1706 %% must not be misrepresented as being the original software.
1707 %%
1708 %% 3. This notice may not be removed or altered from any source
1709 %% distribution.
1710 %%-----
1711
1712 \newif\ifexternalICCprofiles
1713 \newif\ifpdfx@noXMPdata
1714
1715 \begingroup
1716 %% override unneeded color-profile specifier
1717 \ifpdfx@x
1718 \ifno@iccprofile % PDF/X-4p and PDF/X-5pg PDF/VT-2
1719 \begingroup
1720 \def\pdfx@extprofiles@store{AdobeExternalProfiles.tex}%
1721 \InputIfFileExists{\pdfx@extprofiles@store}%
1722 {\global\externalICCprofiletrue \catcode '\# 12\relax}%
1723 {\typeout{** pdfx: No file \pdfx@extprofiles@store\space
1724 found for PDF/X-4p or PDF/X-5pg}}%
1725 \endgroup
1726 \else
1727 \begingroup
1728 \def\pdfx@profiles@store{AdobeColorProfiles.tex}%
1729 \InputIfFileExists{\pdfx@profiles@store}%
1730 {\global\externalICCprofilesfalse \catcode '\# 12\relax}%
1731 {\typeout{** pdfx: No file \pdfx@profiles@store\space
1732 found for PDF/X variants}}%
1733 \endgroup
1734 %% \def\setRGBcolorprofile#1#2#3#4{%
1735 %% \PackageError{pdfx}{PDF/X requires a CMYK color profile}%
1736 %% {Just continue using the default CMYK profile.^^J}}%
1737 \fi
1738 \else
1739 %% load it, in case the macros are used in .xmpdata
1740 \InputIfFileExists{AdobeColorProfiles.tex}{}{}%
1741 \ifpdfx@e
1742 \else
1743 \def\setCMYKcolorprofile#1#2#3#4{%
1744 \def\setGRAYcolorprofile#1#2#3#4{%
1745 \fi\fi
```

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```
1746 %%
1747 \ifluatex\else\ifxetex\else
1748   \inputencoding{8bit}%
1749 \fi\fi
1750 \makeatletter
1751 \pdfx@localcommands
1752 %% Do this in a box, so any stray characters don't get into TeX's lists.
1753 \setbox0\hbox{%
1754   \InputIfFileExists{\jobname.xmpdata}%
1755   {\typeout{** pdfx: Metadata file \jobname.xmpdata  read successfully.}}%
1756   {\typeout{** pdfx: No file  \jobname.xmpdata .
1757     Metadata will be incomplete!}\aftergroup\pdfx@noXMPdatatrue}}
1758 \endgroup
1759 %% -----
1760
1761 \def\pdfx@LanguageSpec{}
1762 \def\pdfx@mainLanguage{en-US}% absolute default
1763 \def\pdfx@checkfor@sep#1#2\sep#3\pdfx@endparse{\def#1{#2}}
1764 \ifx\@empty\xmp@Language\else
1765   \expandafter\pdfx@checkfor@sep\expandafter\pdfx@mainLanguage\xmp@Language
1766   \sep\pdfx@endparse
1767 \fi
1768 \edef\pdfx@LanguageSpec{/Lang (\pdfx@mainLanguage)}
1769
1770 %% -----
1771 \begingroup
1772   \catcode'\_ 12 \catcode'\` 12 \catcode'\` 12
1773   \catcode'\< 12 \catcode'\> 12 \catcode'\ / 12 \catcode'\[ 12 \catcode'\] 12
1774   \edef\@pctchar{\expandafter\@gobble\string}%
1775   \edef\@bchar{\expandafter\@gobble\string\}%
1776   \edef\@0{\string\0}
1777   \edef\@{\string\}
1778   \edef\@{\string\}
1779 %%
1780 \def\pdfx@outcatalog@dict{%
1781   \pdfx@LanguageSpec
1782   /ViewerPreferences <</DisplayDocTitle true >>
1783   /OutputIntents \pdfx@outintents % needs appropriate expansion
1784 }%
1785 \ifpdfx@x % PDF/X needs a CMYK or RGB color profile for printing
1786 \ifno@iccprofile % PDF/X-4p and PDF/X-5pg
1787 %%
1788 %% URL and metadata for the desired external Color Profile
1789 %%
1790 \edef\pdfx@colorURL@dict{<</FS/URL/F(\pdfx@colorURL)>>}
1791 \def\pdfx@colorprofile@dict{<< %
1792   /Checksum <\pdfx@profile@checksum>^^J%
1793   /ICCVersion <\pdfx@iccversion>%
1794   /ProfileCS (\pdfx@profileCS)^^J%
1795   /ProfileName (\pdfx@extprofile)^^J%
1796   /URLs [\OBJ@URLs] >>
1797 }
```

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```
1798 %% How to specify the PDF objects with different drivers
1799 \ifxetex
1800   \def\OBJ@URLs{ @colorURL }%
1801   \def\OBJ@ICC{ @colorprofile }%
1802   \immediate\special{pdf:obj \OBJ@URLs \pdfx@colorURL@dict }%
1803   \immediate\special{pdf:obj \OBJ@ICC \pdfx@colorprofile@dict }%
1804 \else % pdfTeX & LuaTeX
1805   \immediate\pdfobj{\pdfx@colorURL@dict}%
1806   \edef\OBJ@URLs{\the\pdflastobj\space 0 R}%
1807   \immediate\pdfobj{\pdfx@colorprofile@dict}%
1808   \edef\OBJ@ICC{\the\pdflastobj\space 0 R}%
1809 \fi
1810 %% Output Intent dictionary, with object reference
1811 \edef\pdfx@outintent@dict{%
1812   /Type/OutputIntent
1813   /S/GTS_PDFX^^J
1814   /OutputCondition (\pdfx@cmyk@intent)^^J
1815   /OutputConditionIdentifier (\pdfx@cmyk@identifier)^^J
1816   /Info(\pdfx@cmyk@intent)^^J
1817   /RegistryName(\pdfx@cmyk@registry)^^J
1818 %% extra dictionary required for PDF/X-4p and PDF/X-5pg
1819   /DestOutputProfileRef \OBJ@ICC
1820 }%
1821 %%
1822 \else % PDF/X-1 , PDF/X-1a , PDF/X-3 , PDF/X-4 , PDF/X-5g
1823 %%
1824 \ifpdfx@cmyk
1825   \IfFileExists{"\pdfx@cmyk@profile"}{%
1826     % embedded CMYK color profile
1827     %%
1828     %% Output Intent dictionary, with object reference
1829     \def\pdfx@outintent@dict{%
1830       /Type/OutputIntent
1831       /S/GTS_PDFX^^J
1832       /OutputCondition (\pdfx@cmyk@intent)^^J
1833       /OutputConditionIdentifier (\pdfx@cmyk@identifier)^^J
1834       /Info(\pdfx@cmyk@intent)^^J
1835       /RegistryName(\pdfx@cmyk@registry)
1836       /DestOutputProfile \OBJ@CMYK
1837     }%
1838     \def\pdfx@numcoords{/N 4}%
1839     %%
1840     \ifxetex
1841       \def\OBJ@CMYK{@colorprofile}%
1842       \immediate\special{%
1843         pdf:fstream \OBJ@CMYK (\pdfx@cmyk@profile) <<\pdfx@numcoords >>}%
1844     \else % pdfTeX
1845       \immediate\pdfobj stream attr{\pdfx@numcoords} file {\pdfx@cmyk@profile}%
1846       \edef\OBJ@CMYK{\the\pdflastobj\space 0 R}%
1847     \fi
1848     \pdfcatalog{%
1849       \pdfx@LanguageSpec
```

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```
1850 /OutputIntents [ <<
1851 /Type/OutputIntent
1852 /S/GTS_PDFX
1853 /OutputCondition (\pdfx@cmky@intent)%
1854 /OutputConditionIdentifier (\pdfx@cmky@identifier)%
1855 /Info(\pdfx@cmky@intent)%
1856 /RegistryName(\pdfx@cmky@registry)
1857 /DestOutputProfile \OBJ@CMYK
1858 >> ]}%
1859 }{%
1860 \PackageError{pdfx}{No color profile \pdfx@cmky@profilename\space found
1861 to use for CMYK printing colors.}%
1862 {Is this the correct directory: \pdfx@CMYKcolorprofiledir\space ?}%
1863 }% end of \IfFileExists for CMYK
1864 \elseifpdfx@custom
1865 %% allow Custom profile with PDF/X-5n
1866 \IfFileExists{"\pdfx@customcolorprofiledir\pdfx@custom@profile"}{%
1867 %% embedded Custom color profile
1868 %%
1869 %% Output Intent dictionary, with object reference
1870 \def\pdfx@outintent@dict{%
1871 /Type/OutputIntent
1872 /S/GTS_PDFX^^J
1873 /OutputConditionIdentifier (Custom)^^J
1874 /OutputCondition (\pdfx@custom@identifier)^^J
1875 /Info(\pdfx@custom@profile)^^J
1876 /RegistryName(\pdfx@custom@registry)
1877 /Registry(\pdfx@custom@registry)
1878 /DestOutputProfileRef \OBJ@CustomDir
1879 }%
1880 \def\OBJ@CustomDir{<<
1881 \pdfx@numcoords^^J
1882 /URLs [ << /Type /Filespec ^^J/EF \OBJ@CustomFile^^J
1883 /F (\pdfx@custom@profile) /UF (\pdfx@custom@profile) >>]^^J
1884 >>}
1885 %% need more attributes:
1886 \def\pdfx@numcoords{%
1887 /Checksum <\pdfx@profile@checksum>^^J%
1888 /ICCVersion <\pdfx@iccversion>%
1889 /ProfileName (\pdfx@custom@profile)^^J%
1890 /ProfileCS (\pdfx@custom@numcolors)^^J%
1891 /ColorantTable [\pdfx@custom@colornames]
1892 }%
1893 \def\pdfx@custom@filespec{%
1894 /Type /EmbeddedFile >>^^J
1895 /Subtype (application/vnd.iccprofile )
1896 }%
1897 %%
1898 \ifxetex
1899 \def\OBJ@CustomFile{@colorprofile}%
1900 \immediate\special{pdf:fstream \OBJ@CustomFile
1901 (\pdfx@customcolorprofiledir\pdfx@custom@profile) <<\pdfx@custom@filespec >>}%
```

Generation of PDF/X- and PDF/A-compliant PDFs with pdfTeX— `pdfx.sty`

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
1902 \else % pdfTeX
1903 \immediate\pdfobj stream attr{\pdfx@custom@filespec} file %
1904 {\pdfx@custom@colorprofiledir\pdfx@custom@profile}%
1905 \edef\OBJ@CustomFile{\the\pdflastobj\space 0 R}%
1906 \fi
1907 \pdfcatalog{%
1908 \pdfx@LanguageSpec
1909 /OutputIntents [ << \pdfx@outintent@dict >> ]}%
1910 }{%
1911 \PackageError{pdfx}%
1912 {No color profile \pdfx@custom@profile\space found to use for Custom printing colors.}%
1913 {Is this the correct directory: \pdfx@custom@colorprofiledir\space ?}%
1914 }% end of \IfFileExists for Custom
1915 \global\pdfx@cmyktrue % for TeX coloring
1916 %%
1917 \else % allow RGB profile with PDF/X ???
1918 \ifpdfx@noerr
1919 \PackageWarning{pdfx}{PDF/X normally requires a CMYK color profile.^J
1920 Assuming RGB profile is of type 'prtr' not 'mntr'.^J^J}%
1921 \else
1922 \PackageError{pdfx}{PDF/X normally requires a CMYK color profile.}%
1923 {To use RGB ensure profile is of type 'prtr' not 'mntr'.^J^J}%
1924 \fi
1925 % embedded RGB color profile
1926 %%
1927 %% Output Intent dictionary, with object reference
1928 \def\pdfx@outintent@dict{%
1929 /Type /OutputIntent
1930 /S/GTS_PDFX^J
1931 /OutputConditionIdentifier (\pdfx@rgb@identifier)^J
1932 /DestOutputProfile \OBJ@RGB^J
1933 /Info(\pdfx@rgb@info)^J
1934 /RegistryName(\pdfx@rgb@registry)
1935 }%
1936 \IfFileExists{"\pdfx@rgb@profile"}{%
1937 \def\pdfx@numcoords{/N 3 /Alternate/DeviceRGB}
1938 \ifxetex
1939 \immediate\special{%
1940 pdf:fstream @colorprofile (\pdfx@rgb@profile) << \pdfx@numcoords >>}
1941 \def\OBJ@RGB{@colorprofile}%
1942 \else
1943 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
1944 \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
1945 \fi
1946 \edef\pdfx@outintent@dict{%
1947 /Type /OutputIntent
1948 /S/GTS_PDFX
1949 /OutputConditionIdentifier (\pdfx@rgb@identifier)%
1950 /DestOutputProfile \OBJ@RGB
1951 /Info(\pdfx@rgb@info)
1952 /RegistryName(\pdfx@rgb@registry)
1953 }%
```


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```
1954 \ifxetex
1955 \def\OBJ@RGB{ @colorprofile }%
1956 \immediate\special{%
1957 pdf:fstream @colorprofile (\pdfx@rgb@profile) <<\pdfx@numcoords >>}
1958 \else %% pdfTeX or LuaTeX
1959 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
1960 \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
1961 \fi
1962 }{%
1963 \PackageError{pdfx}%
1964 {No color profile \pdfx@rgb@profilename\space found to use for RGB screen colors.}%
1965 {Is this the correct directory: \pdfx@RGBcolorprofiledir\space ?}%
1966 }% end of \IfFileExists for RGB
1967 \fi % end of \ifpdfx@custom
1968 \fi % end of \ifpdfx@cmyk
1969 \fi % end of \ifno@iccprofile
1970 %% end of PDF/X
1971 \else
1972 %% PDF/A and PDF/E can specify a CMYK profile
1973 \expandafter\ifx\expandafter\relax\pdfx@rgb@profile\relax
1974 \global\pdfx@cmyktrue
1975 \IfFileExists{"\pdfx@cmyk@profile"}{%
1976 \def\pdfx@numcoords{/N 4}
1977 % embedded CMYK color profile
1978 \ifxetex
1979 \def\OBJ@CMYK{@colorprofile}%
1980 \special{pdf:fstream @colorprofile (\pdfx@cmyk@profile) <<\pdfx@numcoords >>}
1981 \else %% pdfTeX or LuaTeX
1982 \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@cmyk@profile}%
1983 \edef\OBJ@CMYK{\the\pdflastobj\space 0 R}%
1984 \fi
1985 \edef\pdfx@outintent@dict{%
1986 /Type /OutputIntent
1987 \ifpdfx@e
1988 /S/ISO_PDFE1
1989 \else
1990 /S/GTS_PDFA1
1991 \fi
1992 /OutputCondition (\pdfx@cmyk@intent)% use this or /Info ?
1993 /OutputConditionIdentifier (\pdfx@cmyk@identifier)%
1994 /DestOutputProfile \OBJ@CMYK
1995 /Info(\pdfx@cmyk@intent)%
1996 /RegistryName(\pdfx@cmyk@registry)
1997 }%
1998 }{%
1999 \PackageError{pdfx}{No color profile \pdfx@cmyk@profilename\space found
2000 to use for CMYK printing colors.}%
2001 {Is this the correct directory: \pdfx@CMYKcolorprofiledir\space ?}%
2002 }% end of \IfFileExists for CMYK
2003 \else
2004 %% PDF/A and PDF/E usually need an RGB color profile for on-screen rendering
2005 \global\pdfx@cmykfalse
```

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```
2006 \expandafter\IfFileExists\expandafter{\pdfx@rgb@profile}{%
2007   \def\pdfx@numcoords{/N 3 /Alternate/DeviceRGB}
2008 \ifxetex
2009   \def\OBJ@RGB{ @colorprofile }%
2010   \immediate\special{pdf:fstream @colorprofile (\pdfx@rgb@profile) <<\pdfx@numcoords >>}
2011 \else
2012   \immediate\pdfobj stream attr{\pdfx@numcoords} file{\pdfx@rgb@profile}%
2013   \edef\OBJ@RGB{\the\pdflastobj\space 0 R}%
2014 \fi
2015 \edef\pdfx@outintent@dict{%
2016   /Type /OutputIntent
2017   \ifpdfx@e
2018     /S/ISO_PDFE1
2019   \else
2020     /S/GTS_PDFA1
2021   \fi
2022   /OutputConditionIdentifier (\pdfx@rgb@identifier)%
2023   /DestOutputProfile \OBJ@RGB
2024   /Info(\pdfx@rgb@info)
2025   /RegistryName(\pdfx@rgb@registry)
2026 }%
2027 }{%
2028   \PackageError{pdfx}%
2029   {No color profile \pdfx@rgb@profilename\space found to use for RGB screen colors.}%
2030   {Is this the correct directory: \pdfx@RGBcolorprofiledir\space ?}%
2031 }% end of \IfFileExists for RGB
2032 \fi % end of ifx for PDF/A or PDF/E
2033 \fi % end of ifpdfx@x
2034 %%
2035 \expandafter\ifx\csname pdfx@outintent@dict\endcsname\relax
2036 \else
2037 %%
2038 %% build the OutputIntent array
2039 %%
2040 \ifxetex
2041   \def\pdfx@outintents{ @outintentsarray }%
2042   \def\pdfx@outintentref{ @outintent@dict }%
2043   \immediate\special{pdf:obj \pdfx@outintentref << \pdfx@outintent@dict >>}
2044   \immediate\special{pdf:obj \pdfx@outintents [ ]}%
2045   \immediate\special{pdf:put \pdfx@outintents \pdfx@outintentref }%
2046 \else
2047   \immediate\pdfobj{<<\pdfx@outintent@dict>>}%
2048   \edef\pdfx@outintents{[\the\pdflastobj\space 0 R]}%
2049 \fi
2050 %%
2051 %% make the Catalog entry, if not already done
2052 %%
2053 \ifx\pdfx@outcatalog@dict\relax
2054 \else
2055   \pdfcatalog{\pdfx@outcatalog@dict}%
2056 \fi
2057 \fi % end of OutputIntent array and Catalog entry
```

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```
2058 \endgroup
2059
2060 %% -----
2061 %% Make a version of \xmp@Keywords and \xmp@Author where \sep has been
2062 %% replaced by a comma. The first is for the pdf:Keywords property,
2063 %% which accepts a comma-separated string of keywords, and seems to be
2064 %% mandatory for PDF/A-1 compliance. The second is for the dc:creator
2065 %% property. Although it is defined to be a sequence of authors, Adobe
2066 %% Acrobat will in fact ignore and delete all except the first author.
2067 %% Therefore, it's safer to always separate authors by commas.
2068
2069 \begingroup
2070 \let\pdfx@xmpunimarkup\relax
2071 \pdfx@xmpmarkup
2072 \ifluatex\else\ifxetex\else
2073 \inputencoding{8bit}%
2074 \fi\fi
2075 \makeatletter
2076 \IfFileExists{\pdfx@encodingfile}{%
2077 \def\cf@encoding{L8U}\fontencoding{L8U}%
2078 }{%
2079 \let\protect\@typeset@protect
2080 \pdfx@xmpmarkup %% !!!!! no longer needed
2081 %% \xdef\xmp@@Author{\xmp@Author}% no need to expand
2082 \global\let\xmp@@Author\xmp@Author
2083 \def\sep{;}% expand to replace \sep !!! no longer needed
2084 %% \xdef\xmp@@Copyright{\xmp@Copyright}%
2085 \global\let\xmp@@Copyright\xmp@Copyright
2086 %% \xdef\xmp@@Keywords{\xmp@Keywords}%
2087 %% \global\let\xmp@@Keywords\xmp@Keywords
2088 %% \global\let\xmp@Keywords\@empty %
2089 \global\let\xmp@@Keywords\@empty % don't use pdf:Keywords
2090 \endgroup
2091
2092 %% -----
2093 \def\xmp@convertDate{\pdfx@getYear}
2094 {\catcode'\D=12 \catcode'\:=12
2095 \gdef\pdfx@getYear D:#1#2#3#4{\edef\pdfx@xYear{#1#2#3#4}\pdfx@getMonth}
2096 }
2097 \def\pdfx@getMonth#1#2{\edef\pdfx@xMonth{#1#2}\pdfx@getDay}
2098 \def\pdfx@getDay#1#2{\edef\pdfx@xDay{#1#2}\pdfx@getHour}
2099 \def\pdfx@getHour#1#2{\edef\pdfx@xHour{#1#2}\pdfx@getMin}
2100 \def\pdfx@getMin#1#2{\edef\pdfx@xMin{#1#2}\pdfx@getSec}
2101 \def\pdfx@getSec#1#2{\edef\pdfx@xSec{#1#2}\pdfx@getTZh}
2102 \def\pdfx@getTZh{\futurelet\pdfx@next\pdfx@getTZh@branches}
2103
2104 {\catcode'\@=11 \catcode'\Z=12 \catcode'\+=12 \catcode'\-=12
2105 \gdef\pdfx@getTZh@branches{%
2106 \ifx\pdfx@next Z\let\pdfx@getTZbranch\pdfx@getTznozone
2107 \else\ifx\pdfx@next +\let\pdfx@getTZbranch\pdfx@getTzplus
2108 \else\ifx\pdfx@next -\let\pdfx@getTZbranch\pdfx@getTzminus
2109 \else\let\pdfx@getTZbranch\pdfx@getTzerror
```

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```
2110 \fi\fi\fi \pdfx@getTzbranch }
2111
2112 \catcode'\0=12
2113 \gdef\pdfx@getTznozone Z#1\pdfx@getTzend{%
2114   \edef\pdfx@xTzh{+00}\edef\pdfx@xTzm{00}}
2115 \gdef\pdfx@getTzplus +#1'#2'#3\pdfx@getTzend{%
2116   \edef\pdfx@xTzh{+#{1}}\edef\pdfx@xTzm{#{2}}%
2117   \ifx\relax#2\relax\def\pdfx@xTzm{00}\fi}
2118 \gdef\pdfx@getTzminus -#1'#2'#3\pdfx@getTzend{%
2119   \edef\pdfx@xTzh{-#{1}}\edef\pdfx@xTzm{#{2}}%
2120   \ifx\relax#2\relax\def\pdfx@xTzm{00}\fi}
2121 %%
2122 %% How to support XeTeX here ?
2123 \expandafter\ifx\csname pdfcreationdate\endcsname\relax
2124 %% \xdef\pdfx@convDate{2016-04-01}% April fool!
2125 %% \xdef\xmp@convDate{2016-04-01}% April fool!
2126 \else
2127 \expandafter\expandafter\expandafter\xmp@convertDate\pdfcreationdate'\pdfx@getTzend
2128 \xdef\pdfx@convDate{\pdfx@xYear\pdfx@xMonth\pdfx@xDay\pdfx@xHour
2129   \pdfx@xMin\pdfx@xSec\pdfx@xTzh'\pdfx@xTzm}%
2130 \xdef\xmp@convDate{\pdfx@xYear-\pdfx@xMonth-\pdfx@xDay
2131   T\pdfx@xHour:\pdfx@xMin:\pdfx@xSec\pdfx@xTzh:\pdfx@xTzm}%
2132 \fi
2133 }% end of \catcode
2134
2135 %% -----
2136 %% \pdfx@topdfstring\toka\tokb: Convert the string in \tokb to a format
2137 %% appropriate for PDF /Info strings, i.e., PDFDoc encoding or UTF-16
2138 %% encoding, and store the result in \toka As a special case, if \tokb
2139 %% is \@empty, set \toka to \@empty.
2140
2141 \def\pdfx@topdfstring#1#2{%
2142   \ifx#2\@empty
2143     \global\let#1\empty
2144   \else
2145     \begingroup
2146     \ifluatex\else\ifxetex\else
2147       \inputencoding{utf8}%
2148     \fi\fi
2149     \hypersetup{pdfencoding=auto}%
2150     \pdfstringdef#1{#2}%
2151   \endgroup
2152 \fi
2153 }
2154
2155 %% -----
2156 %% if high-bit characters are already encoded as active
2157 %% then \pdfstringdef probably changes their meaning
2158 %% so save these for later reversion.
2159 %%
2160 \newif\ifpdf@activechars
2161 {\ifnum\catcode'\^c0 = 13\relax \aftergroup\pdf@activecharstrue\fi}%
```

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

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```
2162 %%
2163 %% normally not used with XeTeX or LuaTeX
2164 %%
2165
2166 \ifpdf@activechars
2167 \global\let\pdfx@save@co ^^c0\relax
2168 \global\let\pdfx@save@ci ^^c1\relax
2169 \global\let\pdfx@save@cii ^^c2\relax
2170 \global\let\pdfx@save@ciii ^^c3\relax
2171 \global\let\pdfx@save@civ ^^c4\relax
2172 \global\let\pdfx@save@cv ^^c5\relax
2173 \global\let\pdfx@save@cvi ^^c6\relax
2174 \global\let\pdfx@save@cvii ^^c7\relax
2175 \global\let\pdfx@save@cviii ^^c8\relax
2176 \global\let\pdfx@save@cix ^^c9\relax
2177 \global\let\pdfx@save@ca ^^ca\relax
2178 \global\let\pdfx@save@cb ^^cb\relax
2179 \global\let\pdfx@save@cc ^^cc\relax
2180 \global\let\pdfx@save@cd ^^cd\relax
2181 \global\let\pdfx@save@ce ^^ce\relax
2182 \global\let\pdfx@save@cf ^^cf\relax
2183 \global\let\pdfx@save@do ^^d0\relax
2184 \global\let\pdfx@save@di ^^d1\relax
2185 \global\let\pdfx@save@dii ^^d2\relax
2186 \global\let\pdfx@save@diii ^^d3\relax
2187 \global\let\pdfx@save@div ^^d4\relax
2188 \global\let\pdfx@save@dv ^^d5\relax
2189 \global\let\pdfx@save@dvi ^^d6\relax
2190 \global\let\pdfx@save@dvii ^^d7\relax
2191 \global\let\pdfx@save@dviii ^^d8\relax
2192 \global\let\pdfx@save@dix ^^d9\relax
2193 \global\let\pdfx@save@da ^^da\relax
2194 \global\let\pdfx@save@db ^^db\relax
2195 \global\let\pdfx@save@dc ^^dc\relax
2196 \global\let\pdfx@save@dd ^^dd\relax
2197 \global\let\pdfx@save@de ^^de\relax
2198 \global\let\pdfx@save@df ^^df\relax
2199 \global\let\pdfx@save@eo ^^e0\relax
2200 \global\let\pdfx@save@ei ^^e1\relax
2201 \global\let\pdfx@save@eii ^^e2\relax
2202 \global\let\pdfx@save@eiii ^^e3\relax
2203 \global\let\pdfx@save@eiv ^^e4\relax
2204 \global\let\pdfx@save@ev ^^e5\relax
2205 \global\let\pdfx@save@evi ^^e6\relax
2206 \global\let\pdfx@save@evii ^^e7\relax
2207 \global\let\pdfx@save@eviii ^^e8\relax
2208 \global\let\pdfx@save@eix ^^e9\relax
2209 \global\let\pdfx@save@ea ^^ea\relax
2210 \global\let\pdfx@save@eb ^^eb\relax
2211 \global\let\pdfx@save@ec ^^ec\relax
2212 \global\let\pdfx@save@ed ^^ed\relax
2213 \global\let\pdfx@save@ee ^^ee\relax
```

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```
2214 \global\let\pdfx@save@ef ^^ef\relax
2215 \global\let\pdfx@save@fo ^^f0\relax
2216 \global\let\pdfx@save@fi ^^f1\relax
2217 \global\let\pdfx@save@fii ^^f2\relax
2218 \global\let\pdfx@save@fiii ^^f3\relax
2219 \fi
2220
2221 %% -----
2222 %% detect when \sep is used for multiple authors
2223 %% then suppress the /Author field in PDF /Info
2224 \newif\ifpdfx@sep@infield@
2225 \let\pdfx@endparse\relax
2226 \def\pdfx@parseforsep#1\sep#2\pdfx@endparse{%
2227   \pdfx@sep@infield@false
2228   \ifx\relax#2\relax\else\pdfx@sep@infield@true\fi
2229 }
2230
2231 \begingroup
2232   \let\CATCODE\catcode
2233   \let\ENDGROUP\endgroup
2234   \let\GDEF\gdef
2235   \CATCODE'\m 12 \CATCODE'\a 12 \CATCODE'\c 12 \CATCODE'\r 12 \CATCODE'\o 12
2236   \CATCODE'\: 12 \CATCODE'\- 12 \CATCODE'\> 12
2237   \GDEF\pdfx@DOSTRIP@MACRO macro:->#1\@{#1}%
2238 \ENDGROUP
2239 \def\pdfx@strip@macro#1{%
2240   \expandafter\edef\expandafter#1\expandafter{%
2241     \expandafter\pdfx@DOSTRIP@MACRO\meaning#1\@}%
2242 }
2243
2244 %% Convert the relevant XMP properties to PDF strings, expanding markup
2245 %% (such as \sep, \&, \copyright, etc) in an appropriate way.
2246 %% These PDF strings are actually not always necessary, but if supplied they
2247 %% must match exactly what is in the XMP version. This may be impossible
2248 %% if math symbols are used; e.g. Plane-1 alphanumerics.
2249 %% Generally, it is better to *not* provide PDF-info strings;
2250 %% instead just providing metadata through XMP.
2251 %% This is not always enough â?? a driver may add it by default!
2252 %%
2253 %% But some PDF readers don't support XMP, so it is nice to have
2254 %% /Info fields, when this can be done reliably.
2255 %%
2256 %% 2018-12-16: load package outside the grouping
2257 \RequirePackage{stringenc}%
2258 \begingroup
2259   \catcode'\| 0
2260   \catcode '\\ 12
2261   |gdef |pdfx@parsebackslash#1{%
2262     |begingroup
2263     |def |pdfx@parsemacro{#1}%
2264     |def |pdfx@parseout{}%
2265     |expandafter |pdfx@doparsebackslash#1\|pdfx@endparse
```


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```
2266 }
2267 |gdef |pdfx@doparsebackslash#1\#2|pdfx@endparse{%
2268 |edef |pdfx@parseout{|pdfx@parseout#1}%
2269 |ifx |relax#2|relax
2270 |let |next |pdfx@parseend
2271 |else
2272 |edef |pdfx@parseout{|pdfx@parseout \}%
2273 |def |next{|pdfx@doparsebackslash#2|pdfx@endparse}%
2274 |fi |next
2275 }
2276 |endgroup
2277 \def\pdfx@parseend{%
2278 \edef\next{\endgroup\def\expandafter\noexpand\pdfx@parsemacro{\pdfx@parseout}}%
2279 \next
2280 }%
2281 \begingroup
2282 %% \expandafter\ifx\csname pdf@escapehex\endcsname\relax
2283 %% \PackageWarning{pdfx}{%
2284 %% Missing an implementation of \string\pdf@escapehex ^^J
2285 %% Translated Metadata cannot be generated as PDF strings.^^J}%
2286 %% \def\pdfx@GeneratePdfString#1#2{%
2287 %% \def\pdfx@ConvertUTFtoBE#1#2{%
2288 %% \fi %%\else
2289 \gdef\pdfx@GeneratePdfString#1#2{%
2290 % converts a UTF-8 string to UTF-16be
2291 \StringEncodingConvert{#1}{#2}{utf8}{utf16be}%
2292 \edef\pdfx@tempii{#1}\relax
2293 \xdef#1{\string\376\string\377\pdfescapestring{\pdfx@tempii}}%
2294 }%
2295 \gdef\pdfx@ConvertUTFtoBE#1#2{%
2296 \setbox0=\hbox{% catch any rubbish escaping to the MVL
2297 \def\cf@encoding{L8U}\fontencoding{L8U}%
2298 \ifluatex
2299 %% \let\pdfescapestring\luaescapestring
2300 \else\ifxetex\else
2301 \inputencoding{8bit}%
2302 \fi\fi
2303 %% \pdfx@xmpmarkup %% don't want some things
2304 \pdfx@xmpunimarkup
2305 \let\backslash\textbackslash
2306 \edef\pdfx@temp{#2}% ensure XMP expands to UTF8
2307 \ifluatex
2308 \pdfx@parsebackslash\pdfx@temp
2309 \pdfstringdef{#1}{\pdfx@temp}%
2310 \else\ifxetex
2311 \pdfx@parsebackslash\pdfx@temp
2312 \pdfstringdef{#1}{\pdfx@temp}%
2313 \else
2314 \pdfx@GeneratePdfString{#1}{\pdfx@temp}%
2315 \fi\fi
2316 }% end of \setbox
2317 }%
```

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```
2318 %% \fi
2319 \pdfx@pdfmarkup
2320 \global\let\pdfx@pdfAuthor\@empty
2321 \global\let\pdfx@pdfTitle\@empty
2322 \global\let\pdfx@pdfSubject\@empty
2323 \global\let\pdfx@pdfKeywords\@empty
2324 \ifpdfx@nopdfinfo % transliterated strings present
2325 %% RRM: this may still work with parser macros ???
2326 \expandafter\ifx\expandafter\relax\xmp@Title\relax\else
2327 \pdfx@ConvertUTFtoBE{\pdfx@pdfTitle}{\xmp@Title}%
2328 \fi
2329 \expandafter\ifx\expandafter\relax\xmp@Subject\relax\else
2330 \pdfx@ConvertUTFtoBE{\pdfx@pdfSubject}{\xmp@Subject}%
2331 \fi
2332 \else %% pdfx@nopdfinfo true
2333 \expandafter\ifx\expandafter\relax\xmp@Title\relax\else
2334 \ifluatex
2335 \pdfx@ConvertUTFtoBE\pdfx@pdfTitle\xmp@Title
2336 \else\ifxetex
2337 \pdfx@ConvertUTFtoBE\pdfx@pdfTitle\xmp@Title
2338 \else
2339 \pdfx@GeneratePdfString\pdfx@pdfTitle\xmp@Title
2340 \fi\fi
2341 \fi
2342 \expandafter\ifx\expandafter\relax\xmp@Subject\relax\else
2343 \ifluatex
2344 \pdfx@ConvertUTFtoBE\pdfx@pdfSubject\xmp@Subject
2345 \else\ifxetex
2346 \pdfx@ConvertUTFtoBE\pdfx@pdfSubject\xmp@Subject
2347 \else
2348 \pdfx@GeneratePdfString\pdfx@pdfSubject\xmp@Subject
2349 \fi\fi
2350 \fi
2351 \fi % end of \ifpdfx@nopdfinfo
2352 \pdfx@topdfstring\pdfx@CreatorTool\xmp@CreatorTool
2353 \pdfx@topdfstring\pdfx@Producer\xmp@Producer
2354 %% \pdfescapestring needed
2355 %% \expandafter\ifx\csname pdfescapestring\endcsname\relax
2356 %% \else
2357 \expandafter\ifx\expandafter\relax\xmp@Author\relax
2358 \else
2359 %% check for multiple authors with parser macro
2360 \expandafter\pdfx@parseforsep\xmp@Author\sep\pdfx@endparse
2361 \ifpdfx@sep@infield@
2362 \else
2363 \pdfx@ConvertUTFtoBE{\pdfx@pdfAuthor}{\xmp@Author}%
2364 \fi %% end of \ifpdfx@sep@infield@
2365 \fi %% end of \xmp@Author test
2366 \expandafter\ifx\expandafter\relax\xmp@Keywords\relax
2367 \else
2368 %% check for multiple keywords with parser macro
2369 \expandafter\pdfx@parseforsep\xmp@Keywords\sep\pdfx@endparse
```

Generation of PDF/X- and PDF/A-compliant PDFs with pdfT_EX—pdfx.sty

C. V. Radhakrishnan, Hàn Thế Thành, Ross Moore and Peter Selinger

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```
2370 \ifpdfx@sep@infield@
2371 \else
2372 \pdfx@ConvertUTFtoBE{\pdfx@pdfKeywords}{\xmp@Keywords}%
2373 \fi %% end of \ifpdfx@sep@infield@
2374 \fi %% end of \xmp@Keywords test
2375 %%
2376 %% \fi %% end of \pdfescapestring test
2377 \endgroup
2378
2379 %% Affects CMap creation for certain fonts, according to glyph names
2380 %% How to support XeTeX here ?
2381 %% Maybe it's best to be using an updated mmap.sty ?
2382 \ifxetex
2383 \else
2384 \input glyphtounicode.tex
2385 \input glyphtounicode-cmr.tex
2386 \input glyphtounicode-ntx.tex
2387 \pdfgentounicode=1
2388 \fi
2389 \ifgrkLGRxmp
2390 \ifxetex\else
2391 \pdfglyphtounicode{internalchar2}{200D}%
2392 \fi \fi
2393
2394 %% patch to place accents *after* the base character, rather than before
2395 %% based on coding from mmap.sty by RRM
2396 \newif\ifPDFX@inaccent
2397 \let\LTX@add@accent\add@accent
2398 \def\PDFX@add@accent#1#2{%
2399 \hmode@bgroup
2400 \let \hmode@start@before@group \@firstofone
2401 \setbox\@tempboxa\hbox{\PDFX@inaccenttrue
2402 #2\global\mathchardef\accent@spacefactor\spacefactor}%
2403 #2\kern-\wd\@tempboxa
2404 %% \ifdim\ht\@tempboxa>1ex\relax
2405 \dimen@=\ht\@tempboxa\advance\dimen@-1ex\relax
2406 %%% reduce how much a nested accent is raised
2407 \ifPDFX@inaccent\advance\dimen@-.2ex\relax\fi
2408 \raise\dimen@\hbox to\wd\@tempboxa{\hss
2409 \accent#1{\vphantom{#2}}\hss}%
2410 %% \else
2411 %% \accent#1{\vphantom{#2}}
2412 %% \vrule width\z@ height\ht\@tempboxa depth\dp\@tempboxa}%
2413 %% \fi
2414 \egroup
2415 \spacefactor\accent@spacefactor
2416 }
2417
2418 %% How to support XeTeX here ?
2419 %%% adjust accent characters to the Unicode Combining variant %%%
2420 \def\PDFX@combiningchars@unicode{%
2421 \pdfglyphtounicode{grave}{0300}%
```

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```
2422 \pdfglyphtounicode{acute}{0301}%
2423 \pdfglyphtounicode{circumflex}{0302}%
2424 \pdfglyphtounicode{tilde}{0303}%
2425 \pdfglyphtounicode{macron}{0304}%
2426 \pdfglyphtounicode{Macronsmall}{0304}%
2427 \pdfglyphtounicode{breve}{0306}%
2428 \pdfglyphtounicode{dotaccent}{0307}%
2429 \pdfglyphtounicode{Dotaccent}{0307}%
2430 \pdfglyphtounicode{Dotaccentsmall}{0307}%
2431 \pdfglyphtounicode{dieresis}{0308}%
2432 \pdfglyphtounicode{ogonek}{0309}%
2433 \pdfglyphtounicode{ring}{030A}%
2434 \pdfglyphtounicode{hungarumlaut}{030B}%
2435 \pdfglyphtounicode{caron}{030C}%
2436 \pdfglyphtounicode{cedilla}{0327}%
2437 \pdfglyphtounicode{commaaccent}{0326}% droid
2438 % tie accents in berenisadf lm stix and others
2439 \pdfglyphtounicode{tieaccentlowercase}{0311}%
2440 \pdfglyphtounicode{tieaccentcapital}{0361}%
2441 \pdfglyphtounicode{newtieaccentlowercase}{0311}%
2442 \pdfglyphtounicode{newtieaccentcapital}{0361}%
2443 % cm-unicode
2444 \pdfglyphtounicode{space_uni030D}{030D}%
2445 \pdfglyphtounicode{space_uni030E}{030E}%
2446 \pdfglyphtounicode{space_uni030F}{030F}%
2447 \pdfglyphtounicode{space_uni0311}{0311}%
2448 \pdfglyphtounicode{space_uni0321}{0321}%
2449 \pdfglyphtounicode{space_uni0322}{0322}%
2450 \pdfglyphtounicode{space_uni032A}{032A}%
2451 \pdfglyphtounicode{space_uni032B}{032B}%
2452 \pdfglyphtounicode{space_uni0335}{0335}%
2453 \pdfglyphtounicode{space_uni0337}{0337}%
2454 \pdfglyphtounicode{space_uni033A}{033A}%
2455 \pdfglyphtounicode{space_uni033B}{033B}%
2456 \pdfglyphtounicode{space_uni033C}{033C}%
2457 \pdfglyphtounicode{space_uni034D}{034D}%
2458 }
2459
2460 \AtBeginDocument{%
2461 \ifx\add@accent\LT@add@accent
2462 \let\add@accent\PDFX@add@accent
2463 \else
2464 \expandafter\ifx\csname MT@orig@add@accent\endcsname\relax
2465 \TPDF@error{another package has already patched \string\add@accent }%
2466 \else
2467 \expandafter\let\csname MT@orig@add@accent\endcsname\PDFX@add@accent
2468 \fi\fi
2469 \ifxetex
2470 \else
2471 \PDFX@combiningchars@unicode
2472 \@ifpackageloaded{newtxmath}{%
2473 \pdfglyphtounicode{vec}{20D7}%
```

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```
2474 \pdfglyphtounicode{rvec}{20D6}%
2475 \pdfglyphtounicode{lvec}{20E1}%
2476 }{}%
2477 \fi % end of \ifxetex
2478 }
2479
2480 %% suppress hyperlinks when generating PDF/X
2481 \def\pdfx@linkfile@pdfX#1#2#3{%
2482 \Hy@colorlink\@filecolor#1\Hy@xspace@end}
2483 \def\pdfx@linkstart@pdfX#1#2#3{%
2484 \Hy@colorlink\@linkcolor#3\endgroup\Hy@xspace@end}
2485 \def\pdfx@linkurl@pdfX#1#2{%
2486 \Hy@colorlink\@urlcolor#1\endgroup\Hy@xspace@end}
2487 \def\pdfx@StartlinkName@pdfX#1#2{%
2488 \def\pdfx@close@pdflink{\Hy@VerboseLinkStop\Hy@endcolorlink}%
2489 \def\pdfx@Acrobatmenu@noaction#1#2{#2}
2490
2491 \ifpdfx@x
2492 \let\hyper@linkfile\pdfx@linkfile@pdfX
2493 \let\hyper@linkurl\pdfx@linkurl@pdfX
2494 \let\hyper@linkstart\pdfx@linkstart@pdfX
2495 \let\hyper@linkend\relax
2496 \let\Hy@StartlinkName\pdfx@StartlinkName@pdfX
2497 \let\close@pdflink\pdfx@close@pdflink
2498 \let\AcrobatMenu\pdfx@Acrobatmenu@noaction
2499 \Hy@bookmarksfalse
2500 %% {\def\sep{;}% should not be needed, but just in case
2501 \AtBeginDocument{%
2502 % cancel annotations and links
2503 %
2504 \def\PDF@FinishDoc{% ??? What uses this ???
2505 \begingroup
2506 \def\sep{;}% should not be needed, but just in case
2507 \pdfinfo{%
2508 \ifx\pdfx@pdfTitle\@empty\else /Title(\pdfx@pdfTitle)^J\fi
2509 \ifx\pdfx@pdfAuthor\@empty\else /Author(\pdfx@pdfAuthor)^J\fi
2510 \ifx\pdfx@pdfSubject\@empty\else /Subject(\pdfx@pdfSubject)^J\fi
2511 \ifx\pdfx@pdfKeywords\@empty\else /Keywords(\pdfx@pdfKeywords)^J\fi
2512 /Creator(\pdfx@CreatorTool)^J%
2513 \ifx\pdfcreationdate\@empty
2514 /CreationDate(D:\pdfx@convDate)%
2515 \else
2516 \ifxetex\else
2517 /CreationDate(\@pdfcreationdate)%
2518 \fi\fi
2519 \ifx\pdfmoddate\@empty
2520 /ModDate(D:\pdfx@convDate)%
2521 \else
2522 /ModDate(\@pdfmoddate)%
2523 \fi
2524 ^^J/Producer(\pdfx@Producer)%
2525 /Trapped/False^^J%
```

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```
2526 \ifnum\xmp@Part=1
2527 /GTS_PDFXVersion(PDF/X-1\ifnum\xmp@ReleaseDate>2001
2528 \xmp@Conformance\fi:\xmp@ReleaseDate)%
2529 \else
2530 /GTS_PDFXVersion(PDF/X-\xmp@Part\xmp@Conformance
2531 \ifnum\xmp@Part< 4 :\xmp@ReleaseDate\fi)%
2532 \fi
2533 \ifnum\xmp@Part < 3
2534 /GTS_PDFXConformance(PDF/X-\xmp@Part\xmp@Conformance
2535 :\xmp@ReleaseDate)%
2536 \fi
2537 \ifpdfx@vt
2538 %% support for PDF/VT extensions of PDF/X-4 and PDF/X-5
2539 /GTS_PDFVTVersion(PDF/VT-\xmp@vtPart\xmp@vtConformance)%
2540 \fi
2541 }%% end of PDF/X info
2542 \endgroup %% end of scope for \sep
2543 }%% end of \PDF@FinishDoc
2544 }% end of \AtBeginDocument
2545 %% \pdfinfo{% order of these dictionary keys should not matter
2546 %% \ifx\pdfx@Author\@empty\else /Author(\pdfx@Author)\fi
2547 %% /CreationDate(D:\pdfx@convDate)%
2548 %% /Creator(\pdfx@CreatorTool)%
2549 %% \ifnum\xmp@Part=1
2550 %% /GTS_PDFXVersion(PDF/X-1\ifnum\xmp@ReleaseDate>2001
2551 %% \xmp@Conformance\fi:\xmp@ReleaseDate)%
2552 %% \else
2553 %% /GTS_PDFXVersion(PDF/X-\xmp@Part\xmp@Conformance
2554 %% \ifnum\xmp@Part< 4 :\xmp@ReleaseDate\fi)%
2555 %% \fi
2556 %% \ifnum\xmp@Part < 3
2557 %% /GTS_PDFXConformance(PDF/X-\xmp@Part\xmp@Conformance
2558 %% :\xmp@ReleaseDate)%
2559 %% \fi
2560 %%
2561 %% \ifpdfx@vt
2562 %% support for PDF/VT extensions of PDF/X-4 and PDF/X-5
2563 %% /GTS_PDFVTVersion(PDF/VT-\xmp@vtPart\xmp@vtConformance)%
2564 %% \fi
2565 %% \ifx\pdfx@Keywords\@empty\else /Keywords(\pdfx@Keywords)\fi
2566 %% /ModDate(D:\pdfx@convDate)%
2567 %% /Producer(\pdfx@Producer)%
2568 %% \ifx\pdfx@Subject\@empty\else /Subject(\pdfx@Subject)\fi
2569 %% \ifx\pdfx@Title\@empty\else /Title(\pdfx@Title)\fi
2570 %% /Trapped/False%
2571 %% }% end of PDF/X info
2572 %% }% end of scope for \sep
2573 \else
2574 \ifpdfx@e %% PDF/E
2575 \AtBeginDocument{%
2576 \def\PDF@FinishDoc{% ??? What uses this ???
2577 \beginingroup
```


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```
2578 \def\sep{; }% should not be needed, but just in case
2579 \pdfinfo{%
2580   \ifx\pdfx@pdfTitle\empty\else /Title(\pdfx@pdfTitle)^J\fi
2581   \ifx\pdfx@pdfAuthor\empty\else /Author(\pdfx@pdfAuthor)^J\fi
2582   \ifx\pdfx@pdfSubject\empty\else /Subject(\pdfx@pdfSubject)^J\fi
2583   \ifx\pdfx@pdfKeywords\empty\else /Keywords(\pdfx@pdfKeywords)^J\fi
2584   /Creator(\pdfx@CreatorTool)^J%
2585   \ifx\@pdfcreationdate\empty
2586     /CreationDate(D:\pdfx@convDate)%
2587   \else
2588     \ifxetex\else
2589       /CreationDate(\@pdfcreationdate)%
2590     \fi\fi
2591   \ifx\@pdfmoddate\empty
2592     /ModDate(D:\pdfx@convDate)%
2593   \else
2594     /ModDate(\@pdfmoddate)%
2595   \fi
2596   ^^J/Producer(\pdfx@Producer)%
2597   /Trapped/False^^J%
2598   /GTS_PDFEVersion(PDF/E-1\xmp@Conformance:\xmp@ReleaseDate)%
2599 }% end of PDF/E info
2600 \endgroup %% end of scope for \sep
2601 }% end of \PDF@FinishDoc
2602 }% end of \AtBeginDocument
2603 %% {\def\sep{;}% should not be needed, but just in case
2604 %% \pdfinfo{% order of these dictionary keys should not matter
2605 %%   \ifx\pdfx@Title\empty\else /Title(\pdfx@Title)\fi
2606 %%   \ifx\pdfx@Author\empty\else /Author(\pdfx@Author)\fi
2607 %%   \ifx\pdfx@Subject\empty\else /Subject(\pdfx@Subject)\fi
2608 %%   \ifx\pdfx@Keywords\empty\else /Keywords(\pdfx@Keywords)\fi
2609 %%   \ifx\pdfx@Author\empty\else /Author(\pdfx@Author)\fi
2610 %%   /CreationDate(\pdfx@convDate)%
2611 %%   /Creator(\pdfx@CreatorTool)%
2612 %%   /GTS_PDFEVersion(PDF/E-1\xmp@Conformance:\xmp@ReleaseDate)%
2613 %%   \ifx\pdfx@Keywords\empty\else /Keywords(\pdfx@Keywords)\fi
2614 %%   /ModDate(D:\pdfx@convDate)%
2615 %%   /Producer(\pdfx@Producer)%
2616 %%   \ifx\pdfx@Subject\empty\else /Subject(\pdfx@Subject)\fi
2617 %%   \ifx\pdfx@Title\empty\else /Title(\pdfx@Title)\fi
2618 %%   /Trapped/False%
2619 %% }% end of PDF/E info
2620 %% }% end of scope for \sep
2621 \else %% PDF/A
2622 \def\pdfx@confA{a}%
2623 \def\pdfx@confB{b}%
2624 \def\pdfx@confU{u}%
2625 \expandafter\def\expandafter\xmp@conf\expandafter
2626 {\csname pdfx@conf\xmp@Conformance\endcsname}%
2627 \AtBeginDocument{%
2628 \def\PDF@FinishDoc{% ??? What uses this ???
2629 \begingroup
```

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```
2630 \def\sep{; }% should not be needed, but just in case
2631 \pdfinfo{%
2632   \ifx\pdfx@pdfTitle\@empty\else /Title(\pdfx@pdfTitle)^J\fi
2633   \ifx\pdfx@pdfAuthor\@empty\else /Author(\pdfx@pdfAuthor)^J\fi
2634   \ifx\pdfx@pdfSubject\@empty\else /Subject(\pdfx@pdfSubject)^J\fi
2635   \ifx\pdfx@pdfKeywords\@empty\else /Keywords(\pdfx@pdfKeywords)^J\fi
2636   /Creator(\pdfx@CreatorTool)^J%
2637   \ifx\@pdfcreationdate\@empty
2638     /CreationDate(D:\pdfx@convDate)%
2639   \else
2640     \ifxetex\else
2641       /CreationDate(\@pdfcreationdate)%
2642     \fi\fi
2643   \ifx\@pdfmoddate\@empty
2644     /ModDate(D:\pdfx@convDate)%
2645   \else
2646     /ModDate(\@pdfmoddate)%
2647   \fi
2648   ^^J/Producer(\pdfx@Producer)%
2649   /Trapped/False^^J%
2650   /GTS_PDFa1Version (PDF/A-\xmp@Part\xmp@conf:\xmp@ReleaseDate)%
2651 }% end of PDF/A info
2652 \endgroup %% end of scope for \sep
2653 }% end of \PDF@FinishDoc
2654 }% end of \AtBeginDocument
2655 \fi\fi
2656
2657 %%-----
2658 %% 2018-12-16: xmpincl needs the ifthen package
2659 %% it should be loaded outside the grouping, else biblatex may barf
2660 %%
2661 \RequirePackage{ifthen}
2662 \begingroup
2663 %% override the \ifpdf check of xmpincl package, inside the grouping
2664 \pdftrue
2665 \RequirePackage{xmpincl}
2666 %% combine coding from xmpincl and hyperxml to support XeTeX
2667 \def\pdfx@xmpincl@xetex#1{%
2668   \IfFileExists{#1.xmp}{%
2669     \mcs@xmpincl@patchFile{#1}%
2670   \begingroup
2671     \special{pdf:fstream @pdfx@Metadata (#1.xmpi)
2672     <<
2673       /Type /Metadata
2674       /Subtype /XML
2675     >>
2676   }%
2677   \special{pdf:put @catalog
2678   <<
2679     /Metadata @pdfx@Metadata
2680   >>
2681   }%
```

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```
2682 \endgroup
2683 }{%
2684 \newcommand{\mcs@xmpincl@filename}{#1.xmp}%
2685 \PackageError{xmpincl}%
2686 {The file \mcs@xmpincl@filename\space was not found}%
2687 {The file \mcs@xmpincl@filename\space The metadata file
2688   wasn't found.\MessageBreak Oops.}%
2689 }
2690 }
2691 \ifxetex
2692 \let\includexmp\pdfx@xmpincl@xetex
2693 \fi
2694
2695 %% macro provided by Leonardo E. Segovia on 2017-05-15
2696 %% <leonardo.segovia@cs.uns.edu.ar>
2697 \def\pdfx@xmpincl@luatex#1{%
2698 \IfFileExists{#1.xmp}{%
2699   \mcs@xmpincl@patchFile{#1}%
2700   \begingroup
2701   \pdfcompresslevel=0
2702   \immediate\pdfobj uncompressed stream attr {/Type /Metadata /Subtype /XML}
2703   file{#1.xmpi}%
2704   \pdfcatalog{%\pdfx@LanguageSpec
2705     /Metadata \the\pdflastobj\space 0 R}%
2706   \endgroup
2707 }{%
2708 \newcommand{\mcs@xmpincl@filename}{#1.xmp}%
2709 \PackageError{xmpincl}%
2710 {The file \mcs@xmpincl@filename\space was not found}%
2711 {The file \mcs@xmpincl@filename\space The metadata file
2712   wasn't found.\MessageBreak Oops.}%
2713 }
2714 }
2715 \ifluatex
2716 \let\includexmp\pdfx@xmpincl@luatex
2717 \fi
2718
2719 %%-----
2720 \begingroup
2721 \ifpdfx@x
2722 \ifpdfx@vt
2723 \def\xmp@template{pdfvt}%
2724 \else
2725 \def\xmp@template{pdfx}% formerly pdfx-1a
2726 \fi
2727 \else
2728 \ifpdfx@e
2729 \def\xmp@template{pdfex}%
2730 \else
2731 \def\xmp@template{pdfa}%
2732 \fi\fi
2733 \catcode'\'=12 \catcode'\<=12 \catcode'\>=12 \catcode'\?=12
```

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```
2734 \catcode'\="=12 \catcode'\= 12 %% used within the template file
2735 %% patch commands from xmpincl.sty ...
2736 \def\pdfx@xmpinclStart{% supply byte-order marker
2737   <?xpacket begin='^^ef^^bb^^be' id='W5M0MpCehiHzreSzNTczkc9d' ?> %
2738 }%
2739 \def\pdfx@xmpinclStartAlt{% no byte-order marker
2740   <?xpacket begin='' id='W5M0MpCehiHzreSzNTczkc9d' ?> %
2741 }%
2742 \def\pdfx@xmpinclEnd{% allow XMP packet to be writable
2743   <?xpacket end='w'?> %
2744 }%
2745 \let\mcs@xmpinclStart\pdfx@xmpinclStart
2746 \let\mcs@xmpinclStartAlt\pdfx@xmpinclStartAlt
2747 \ifpdfx@noBOM % don't use the byte-order marker
2748   \let\mcs@xmpinclStart\pdfx@xmpinclStartAlt
2749 \fi
2750 \let\mcs@xmpinclEnd\pdfx@xmpinclEnd
2751 %% ... preventing their redefinition
2752 \def\newcommand#1#2{%
2753   %%
2754   %% \def\pdfx@endeval{%
2755   %% \noexpand \TE@setvaltrue \noexpand \else
2756   %% \noexpand \TE@setvalfalse \noexpand \fi
2757   %% \noexpand \TE@negatefalse \noexpand \fi}%
2758   %% \let\TE@endeval\pdfx@endeval
2759   \ifluatex\else\ifxetex\else
2760     \inputencoding{8bit}%
2761   \fi\fi
2762   \makeatletter
2763   \def\cf@encoding{L8U}\fontencoding{L8U}%
2764   \providecommand{\ifnot@empty}[2]{\ifx#1\@empty\relax\else#2\fi}%
2765   \pdfx@xmpmarkup
2766 \expandafter\global\expandafter
2767   \let\csname L8U-cmd\expandafter\endcsname\csname U-cmd\endcsname
2768   \def\cf@encoding{L8U}\fontencoding{L8U}%
2769   \providecommand{\ifnot@empty}[2]{\ifx#1\@empty\relax\else#2\fi}%
2770   \obeyspaces%
2771   %% beware 128 space characters -- for padding end of XMP packet
2772   \gdef\paddingline{
2773     \typeout{Using XMP template file: \xmp@template.xmp}%
2774     \includexmp{\xmp@template}%
2775   \endgroup
2776
2777   %%
2778   %% revert active characters to previous encoding
2779   %%
2780   \ifpdf@activechars
2781     \global\let ^^c0\pdfx@save@co
2782     \global\let ^^c1\pdfx@save@ci
2783     \global\let ^^c2\pdfx@save@cii
2784     \global\let ^^c3\pdfx@save@ciii
2785     \global\let ^^c4\pdfx@save@civ
```

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```
2786 \global\let ^^c5\pdfx@save@cv
2787 \global\let ^^c6\pdfx@save@cvi
2788 \global\let ^^c7\pdfx@save@cvi i
2789 \global\let ^^c8\pdfx@save@cvi i i
2790 \global\let ^^c9\pdfx@save@cix
2791 \global\let ^^ca\pdfx@save@ca
2792 \global\let ^^cb\pdfx@save@cb
2793 \global\let ^^cc\pdfx@save@cc
2794 \global\let ^^cd\pdfx@save@cd
2795 \global\let ^^ce\pdfx@save@ce
2796 \global\let ^^cf\pdfx@save@cf
2797 \global\let ^^d0\pdfx@save@do
2798 \global\let ^^d1\pdfx@save@di
2799 \global\let ^^d2\pdfx@save@di i
2800 \global\let ^^d3\pdfx@save@di i i
2801 \global\let ^^d4\pdfx@save@div
2802 \global\let ^^d5\pdfx@save@dv
2803 \global\let ^^d6\pdfx@save@dvi
2804 \global\let ^^d7\pdfx@save@dvi i
2805 \global\let ^^d8\pdfx@save@dvi i i
2806 \global\let ^^d9\pdfx@save@dix
2807 \global\let ^^da\pdfx@save@da
2808 \global\let ^^db\pdfx@save@db
2809 \global\let ^^dc\pdfx@save@dc
2810 \global\let ^^dd\pdfx@save@dd
2811 \global\let ^^de\pdfx@save@de
2812 \global\let ^^df\pdfx@save@df
2813 \global\let ^^e0\pdfx@save@eo
2814 \global\let ^^e1\pdfx@save@ei
2815 \global\let ^^e2\pdfx@save@ei i
2816 \global\let ^^e3\pdfx@save@ei i i
2817 \global\let ^^e4\pdfx@save@eiv
2818 \global\let ^^e5\pdfx@save@ev
2819 \global\let ^^e6\pdfx@save@evi
2820 \global\let ^^e7\pdfx@save@ev i i
2821 \global\let ^^e8\pdfx@save@ev i i i
2822 \global\let ^^e9\pdfx@save@eix
2823 \global\let ^^ea\pdfx@save@ea
2824 \global\let ^^eb\pdfx@save@eb
2825 \global\let ^^ec\pdfx@save@ec
2826 \global\let ^^ed\pdfx@save@ed
2827 \global\let ^^ee\pdfx@save@ee
2828 \global\let ^^ef\pdfx@save@ef
2829 \global\let ^^f0\pdfx@save@fo
2830 \global\let ^^f1\pdfx@save@fi
2831 \global\let ^^f2\pdfx@save@fi i
2832 \global\let ^^f3\pdfx@save@fi i i
2833 \fi
2834
2835 \endgroup
2836
2837 %%
```

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```
2838 %% controls the color model and conversions with xcolor package
2839 %%
2840 \ifpdfx@cmymk
2841 %
2842 % this will have been done already for PDF/X
2843 %
2844 \PassOptionsToPackage{xcolor}{cmymk,hyperref}
2845 \def\pdfx@handlexcolor{\def\@mod{cmymk}\selectcolormodel{cmymk}%
2846   \convertcolorsUtrue\convertcolorsDtrue}
2847 \ifpdfx@x
2848 \else
2849 %% \AtBeginDocument{%
2850 %%   \def\@linkcolor{0 1 1 0}%
2851 %%   \def\@anchorcolor{0 0 1}%
2852 %%   \def\@citecolor{1 0 1 0}%
2853 %%   \def\@filecolor{.5 0 0 .5}%
2854 %%   \def\@urlcolor{0 1 0 0}%
2855 %%   \def\@menucolor{0 1 1 0}%
2856 %%   \def\@runcolor{.5 0 0 .5}%
2857 %%   \def\@linkbordercolor{0 1 1 0}%
2858 %%   \def\@citebordercolor{1 0 1 0}%
2859 %%   \def\@filebordercolor{.5 0 0 .5}%
2860 %%   \def\@urlbordercolor{1 0 0 0}%
2861 %%   \def\@menubordercolor{0 1 1 0}%
2862 %%   \def\@runbordercolor{.7 0 0 .3}%
2863 %%   \def\Fld@bcolor{0 0 0 0}%
2864 %%   \def\Fld@bordercolor{0 1 1 0}%
2865 %% }
2866 \fi
2867 \else
2868 \PassOptionsToPackage{xcolor}{rgb,hyperref}
2869 \def\pdfx@handlexcolor{\def\@mod{rgb}\selectcolormodel{rgb}%
2870   \convertcolorsUtrue\convertcolorsDtrue}
2871 \fi
2872 \@ifpackageloaded{xcolor}{\pdfx@handlexcolor
2873   \ifpdfx@cmymk\else\color{black}\fi}{%
2874   \AtBeginDocument{\@ifpackageloaded{xcolor}{\pdfx@handlexcolor}}}%
2875 }
2876
2877 %%-----
2878 %% Disable some actions in Beamer navigation
2879 \@ifclassloaded{beamer}{%
2880   \let\real@insertslidenavigationsymbol
2881   \insertslidenavigationsymbol
2882   \let\real@insertbackfindforwardnavigationsymbol
2883   \insertbackfindforwardnavigationsymbol
2884   \def\pdfx@insertslidenavigationsymbol{%
2885     \let\Acrobatmenu\pdfx@Acrobatmenu@noaction
2886     \real@insertslidenavigationsymbol
2887   }%
2888   \def\pdfx@insertbackfindforwardnavigationsymbol{%
2889     \let\Acrobatmenu\pdfx@Acrobatmenu@noaction
```


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```
2890 \real@insertbackfindforwardnavigationsymbol
2891 }}%
2892 \AtBeginDocument{%
2893 \ifHy@pdfa
2894 \let\insertslidenavigationsymbol
2895 \pdfx@insertslidenavigationsymbol
2896 \let\insertbackfindforwardnavigationsymbol
2897 \pdfx@insertbackfindforwardnavigationsymbol
2898 \fi}%
2899 }{}
2900
2901 %%-----
2902 \ifpdfx@transliterated
2903 %% support for bookmarks with transliterated input
2904 \ifxetex\let\pdf@escapehex\empty\fi % don't need it
2905 \expandafter\ifx\csname pdf@escapehex\endcsname\relax
2906 \PackageWarning{pdfx}{%
2907 Missing an implementation of \string\pdf@escapehex ^^J
2908 Translated Bookmarks cannot be generated.^^J}%
2909 \newcommand{\pdfxBookmark}[4][\{#2[#1]{#4}}}%
2910 \else
2911 \def\pdfx@GeneratePdfString#1#2{%
2912 % converts a UTF-8 string to UTF-16be
2913 \StringEncodingConvert{#1}{#2}{utf8}{utf16be}%
2914 \edef#1{\string\376\string\377\pdfescapestring{#1}}%
2915 }
2916 \newtoks\pdfx@DisabledCommands
2917 \def\pdfxDisableCommands#1{%
2918 \expandafter\pdfx@DisabledCommands
2919 \expandafter{\the\pdfx@DisabledCommands#1}}
2920 \pdfxDisableCommands{%
2921 \def\80{% else \000\ ( --> \000\80\050 \000\000\050
2922 \aftergroup\let\aftergroup\HyPsd@ConvertToUnicode\aftergroup\@gobble}
2923 \let\Hy@@writetorep\@writetorep
2924 \def\pdfx@@writetorep#1#2#3#4#5{%
2925 \begingroup
2926 \pdfx@xmpunimarkup
2927 \pdfx@prebookmark
2928 \edef\pdfstringdefPreHook{\pdfstringdefPreHook
2929 \the\pdfx@DisabledCommands}%
2930 \Hy@@writetorep{#1}{#2}{#3}{#4}{#5}%
2931 \endgroup
2932 }
2933 \newcommand{\pdfxBookmark}[4][\{#2[#1]{#4}}}%
2934 \ifx\relax#3\relax
2935 \PackageError{pdfx}{Unknown macro \string#3.
2936 A proper bookmark cannot be created}%
2937 {Proceed to process the \string#1 as usual.}%
2938 #2{#4}%
2939 \else
2940 \ifluatex % use the utf8 directly
2941 \let\pdfx@temp#3\relax
```

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```
2942 \def\pdfx@prebookmark{%
2943   \pdfx@DisabledCommands{}%
2944   \let#3\pdfx@temp
2945 }%
2946 \else\ifxetex % use the utf8 directly
2947   \let\pdfx@temp#3\relax
2948   \def\pdfx@prebookmark{%
2949     \pdfx@DisabledCommands{}%
2950     \let#3\pdfx@temp
2951   }%
2952 \else
2953   % convert the utf8 to utf16be
2954   \pdfxBookmarkString\pdfx@temp{#3}%
2955 \fi\fi
2956 \let\@@writetorep\pdfx@@writetorep
2957 \ifx\empty#1\empty
2958   \def#3{#4}%
2959   #2{#3}%
2960 \else
2961   \def#3{#1}%
2962   #2[#3]{#4}%
2963 \fi
2964 \let\@@writetorep\Hy@@writetorep
2965 \fi
2966 \ignorespaces
2967 }
2968 %% use as: \pdfxBookmark{\section}{\sectAtitle}{...}
2969 %% use as: \pdfxBookmark[<opt-title>]{\section}{\sectAtitle}{...}
2970 %% only needed by pdfTeX --- Lua-/XeTeX use the utf8 directly
2971 \def\pdfxBookmarkString#1#2{%
2972   \pdfx@GeneratePdfString#1{#2}%
2973   \def\pdfx@prebookmark{%
2974     \pdfxDisableCommands{\let#2#1}%
2975   }%
2976 }
2977 %% use as: \pdfxBookmarkString\PdfSectA\sectAtitle
2978 %% where \sectAtitle has been defined by e.g.
2979 %% \pdfxEnableCommands{\xdef\sectAtitle{\textLGR{...}}}
2980
2981 \fi % end of \ifx\pdf@escapehex\relax
2982 \fi % end of \ifpdfx@transliterated
2983
2984 %%-----
2985
2986 %% disable hyperref options,
2987 %% to prevent changes that will cause an incompatibility
2988 \Hy@DisableOption{pdfauthor}%
2989 \Hy@DisableOption{pdftitle}%
2990 \Hy@DisableOption{pdfsubject}%
2991 \Hy@DisableOption{pdfcreator}%
2992 \Hy@DisableOption{pdfcreationdate}%
2993 \Hy@DisableOption{pdfmoddate}%
```

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```
2994 \Hy@DisableOption{pdfproducer}%
2995 \Hy@DisableOption{pdfkeywords}%
2996 %% once set correctly, don't let this change
2997 \Hy@DisableOption{pdfa}\let\Hy@pdfafalse\relax\let\Hy@pdfatrue\relax
2998 \endinput
2999 %%
3000 %% End of file 'pdfx.sty'.
```

7. Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; numbers in *roman* refer to the code lines where the entry is used.

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8. Change History

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|---------|--|---|
| v1.00 | General: Initial commit to the CVS. | 1 |
| v1.01 | General: glyphtounicode-cmr.tex included with the package. | 1 |
| v1.3 | General: Fix copyright in xmp files. | 1 |
| v1.5.4 | General: Fixed timezone bug; Unicode support; more PDF variants; added color profiles. | 1 |
| v1.5.5 | General: Support for PDF/X-4p and PDF/X-5pg with external color profiles. | 1 |
| v1.5.6 | General: Suppressed ‘dummy-space’ font warning; removed spurious ‘?’ in XMP packets; improved handling of Color Profiles; ensure Hy@pdfatruue when building PDF/A, for link flags; properly enables xcolor conversion of color models. | 1 |
| v1.5.7 | General: Removed UTF-8 characters that appear in the documentation only, within comments in the package source, but result in a validation failure. Language support in XMP metadata. Added macros for Windows and Mac system color profile directories. | 1 |
| v1.5.8 | General: MediaBox, TrimBox, etc. derived from the paperheight, paperwidth. Improved language support, incl. KOI8-R encoded cyrillics, Armenian OT6, and LGR Greek encoding, incl. polytonic Greek. All the encodings Latin-1–9 are supported for upper 8-bit characters. Fixed the quoted file-name problem, evident with LuaTeX. Method to generate correct bookmarks with non-active (transliterated) input. Added support for XeLaTeX, improvements with LuaTeX. Updated documentation. | 1 |
| v1.5.82 | General: Adjusted to changes in the LaTeX core, affecting macros for composite commands; incl. \textsuperscript and others. | 1 |
| v1.5.83 | General: Improved support for XeLaTeX and LuaLaTeX. | 1 |
| v1.5.84 | General: Fully expand options for hyperref. Better support for extended IPA letters and modifiers. Adjusted release versions and dates. | 1 |
| v1.5.85 | General: Fixed bugs, and fully implemented L8U as a pseudo-encoding; renamed L8U files into the form *-penc.def | 1 |
| v1.6 | General: Added XMP support for PDF/UA-1. Added more Metadata fields and Language support. Default RGB and CMYK profiles now require the colorprofiles.sty package. Added file CallasColorProfiles.tex . Revised glyphtounicode.sty to use variation selectors, altered maps to PUA codepoints; added more glyphs via glyphtounicode-ntx.tex . Support for 8-bit Hebrew encodings, some Arabic and Devanagari. Updated documentation, incl. for LaTeX changes. | 1 |

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v1.6.1

General: Fixed issue with ifthen package; improved Metadata with LuaTeX and XeTeX.

Flexibility with page boxes for PDF/X. 1