Π Ο Λ Υ Γ Λ Ω Σ Σ Ι Α

Polyglossia: An Alternative to Babel for XᴻLᴬTᴇX and LuaLᴬTᴇX

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Contents

1 Introduction

Polyglossia is a package for facilitating multilingual typesetting with X∃LATEX and (at an early stage) LuaLATEX. Basically, it can be used as an alternative to babel for performing the following tasks automatically:

1. Loading the appropriate hyphenation patterns.
2. Setting the script and language tags of the current font (if possible and available), via the package fontspec.
3. Switching to a font assigned by the user to a particular script or language.
4. Adjusting some typographical conventions according to the current language (such as afterindent, frenchindent, spaces before or after punctuation marks, etc.).
5. Redefining all document strings (like "chapter", "figure", "bibliography").
6. Adapting the formatting of dates (for non-Gregorian calendars via external packages bundled with polyglossia: currently the Hebrew, Islamic and Farsi calendars are supported).
7. For languages that have their own numbering system, modifying the formatting of numbers appropriately (this also includes redefining the alphabetic sequence for non-Latin alphabets).[1]
8. Ensuring proper directionality if the document contains languages that are written from right to left (via the package bidi, available separately).

Several features of babel that do not make sense in the X∃TEX world (like font encodings, shorthands, etc.) are not supported. Generally speaking, polyglossia aims to remain as compatible as possible with the fundamental features of babel while being cleaner, light-weight, and modern. The package antomega has been very beneficial in our attempt to reach this objective.

Requirements: The current version of polyglossia makes use of some convenient macros defined in the etoolbox package by Philipp Lehmann. Being designed for X∃LATEX and LuaLATEX, it obviously also relies on fontspec by Will Robertson. For languages written from right to left, it needs the package bidi by Vafa Khalighi (وفا خلیقی). Polyglossia also bundles three packages for calendaric computations (hebrewcal, hijrical, and farsical).

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[1]For the Arabic script this is now done by the bundled package arabicnumbers.

2 Loading language definition files

2.1 The recommended way

You can determine the default language by means of the command:

`\setdefaultlanguage` $\qquad$ `\setdefaultlanguage[⟨options⟩]{lang}`

`\setmainlanguage` (or equivalently `\setmainlanguage`). Secondary languages can be loaded with

`\setotherlanguage` $\qquad$ `\setotherlanguage[⟨options⟩]{lang}`.

These commands have the advantage of being explicit and of allowing you to set language-specific options.[2] It is also possible to load a series of secondary languages at once using

`\setotherlanguages` $\qquad$ `\setotherlanguages{lang1,lang2,lang3,…}`.

Language-specific options can be set or changed at any time by means of

`\setkeys` $\qquad$ `\setkeys{⟨lang⟩}{opt1=value1,opt2=value2,…}`.

2.2 The "Babel way" – obsolete

v1.2.0 ← **Warning**: polyglossia no longer supports loading language definition files as package options!

2.3 Supported languages

Table 2.3 lists all languages currently supported. Those in red have specific options and/or commands that are explained in section 6 below.

v1.0.1 *NB:* The support for Amharic ← should be considered an experimental attempt to port the package ethiop.[3] Version 1.1.1 ← added support for Asturian, Lithuanian, and Urdu. Version 1.2 ← adds support for Armenian, Occitan, Bengali, Lao, Malayalam, Marathi, Tamil, Telugu, and Turkmen.[4]

v1.1.1 Polyglossia can also be loaded with the option 'babelshorthands' ←, which globally activates babel shorthands whenever available. Currently shorthands are implemented for Catalan, Dutch, German, Italian, and Russian: see these respective languages for details.

v1.2.0 Another option (turned off by default) is 'localmarks', which redefines the internal LATEX macros `\markboth` and `\markright`. ←Note that this was formerly turned on by default, but we now realize that it causes more problems than otherwise. For backwards-compatibility the opposite option 'nolocalmarks' is still

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[2]More on language-specific options below.
[3]Feedback is welcome.
[4]See acknowledgements at the end for due credit to the various contributors.

albanian	danish	icelandic	nko	slovenian
amharic	divehi	interlingua	norsk	spanish
arabic	dutch	irish	nynorsk	swedish
armenian	english	italian	occitan	syriac
asturian	esperanto	kannada	piedmontese	tamil
bahasai	estonian	khmer	polish	telugu
bahasam	farsi	korean	portuges	thai
basque	finnish	lao	romanian	tibetan
bengali	french	latin	romansh	turkish
brazil[ian]	friulan	latvian	samin	turkmen
breton	galician	lithuanian	russian	ukrainian
bulgarian	german	lsorbian	sanskrit	urdu
catalan	greek	magyar	scottish	usorbian
coptic	hebrew	malayalam	serbian	vietnamese
croatian	hindi	marathi	slovak	welsh
czech				

Table 1: Languages currently supported in polyglossia

available.

There is also the option 'quiet' which turns off most info messages and some of the warnings issued by LaTeX, fontspec and polyglossia.

3   Language-switching commands

Whenever a language definition file `gloss-⟨lang⟩.ldf` is loaded, the command \text⟨lang⟩ `\text⟨lang⟩[⟨options⟩]{…}` becomes available for short insertions of text in that language. For example `\textrussian{\today}` yields 25 марта 2016 г. Longer passages are better put between the environment ⟨lang⟩ (again with the ⟨lang⟩ possibility of setting language options locally. For instance the following allows us to quote the beginning of Homer's *Iliad*:

```
\begin{greek}[variant=ancient]
μῆνιν ἄειδε θεὰ Πηληϊάδεω Ἀχιλῆος οὐλομένην, ἣ μυρί' Ἀχαιοῖς ἄλγε'
ἔθηκε, πολλὰς δ' ἰφθίμους ψυχὰς Ἄϊδι προΐαψεν ἡρώων, αὐτοὺς δὲ ἑλώρια
τεῦχε κύνεσσιν οἰωνοῖσί τε πᾶσι, Διὸς δ' ἐτελείετο βουλή, ἐξ οὗ δὴ τὰ
πρῶτα διαστήτην ἐρίσαντε Ἀτρείδης τε ἄναξ ἀνδρῶν καὶ δῖος Ἀχιλλεύς.
\end{greek}
```

μῆνιν ἄειδε θεὰ Πηληϊάδεω Ἀχιλῆος οὐλομένην, ἣ μυρί' Ἀχαιοῖς ἄλγε' ἔθηκε, πολλὰς δ' ἰφθίμους ψυχὰς Ἄϊδι προΐαψεν ἡρώων, αὐτοὺς δὲ ἑλώρια τεῦχε κύνεσσιν οἰωνοῖσί τε πᾶσι, Διὸς δ' ἐτελείετο βουλή, ἐξ οὗ δὴ τὰ πρῶτα διαστήτην ἐρίσαντε Ἀτρεΐδης τε ἄναξ ἀνδρῶν καὶ δῖος Ἀχιλλεύς.

Note that for Arabic one cannot use the environment `arabic`, as `\arabic` is defined internally by LaTeX. In this case we need to use the environment `Arabic`

Arabic   instead.

3.1 Other commands

The following commands are probably of lesser interest to the end user, but ought to be mentioned here.

`\selectbackgroundlanguage`   ‣ `\selectbackgroundlanguage`: this selects the global font setup and the numbering definitions for the default language.

`\resetdefaultlanguage`   ‣ `\resetdefaultlanguage` (experimental): completely switches the default language to another one in the middle of a document: *this may have adverse effects*!

`\normalfontlatin`   ‣ `\normalfontlatin`: in an environment where `\normalfont` has been redefined to a non-latin script, this will call the font defined with `\setmain-`

`\rmfamilylatin`   `font` etc. Likewise it is possible to use `\rmfamilylatin`, `\sffamilylatin`,

`\sffamilylatin`   and `\ttfamilylatin`.

`\ttfamilylatin`   ‣ Some macros defined in babel's `hyphen.cfg` (and thus usually compiled into the XƎLATEX and LuaLATEX format) are redefined, but keep a similar behaviour, namely `\selectlanguage`, `\foreignlanguage`, and the environ-

`\selectlanguage`   ment `otherlanguage`.

`\foreignlanguage`

`otherlanguage`   Since the XƎLATEX and LuaLATEX format incorporate babel's `hyphen.cfg`, the low-level commands for hyphenation and language switching defined there are also accessible.

4 Font setup

With polyglossia it is possible to associate a specific font with any script or language that occurs in the document. That font should always be defined as `\⟨script⟩font` or `\⟨language⟩font`. For instance, if the default font defined by `\setmainfont` does not support Greek, then one can define the font used to display Greek with:

        `\newfontfamily\greekfont[Script=Greek,⟨…⟩]{⟨font⟩}`.

Note that polyglossia will use the font thus defined as is. for instance if \arabicfont is explicitly defined, then one should take care of including the option Script=Arabic in that definition. See the fontspec documentation for more information. If a specific sans or monospace font is needed for a particular script or language, it can be defined by means of ← \⟨script⟩fontsf or \⟨language⟩fontsf and \⟨script⟩fonttt or \⟨language⟩fonttt, respectively.

Whenever a new language is activated, polyglossia will first check whether a font has been defined for that language or – for languages in non-Latin scripts – for the script it uses. If it is not defined, it will use the currently active font and – in the case of OpenType fonts – will attempt to turn on the appropriate OpenType tags for the script and language used, in case these are available in the font, by means of fontspec's \addfontfeature. If the current font does not appear to support the script of that language, an error message is displayed.

5 Hyphenation disabling

In some very specific contexts (such as music score creation), TeX hyphenation is something to avoid as it may cause troubles. polyglossia provides two functions: \disablehyphenation and \enablehyphenation. Note that when you select a new language, hyphenation will be in the same state (enabled or disabled) as before. When you reenable it, it will take the last selected language.

6 Language-specific options and commands

This section gives a list of all languages for which options and end-user commands are defined. The default value of each option is given in italic.

6.1 arabic

Options:
  ‣ **calendar** = *gregorian* or islamic (= hijri)
  ‣ **locale** = *default*,[5] mashriq,[6] libya, algeria, tunisia, morocco, or mauritania. This setting influences the spelling of the month names for the Gregorian calendar, as well as the form of the numerals (unless overriden by the following option).

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[5]For Egypt, Sudan, Yemen and the Gulf states.
[6]For Iraq, Syria, Jordan, Lebanon and Palestine.

- ‣ **numerals** = *mashriq* or maghrib (the latter is the default when locale = algeria, tunisia or morocco)

- ‣ **abjadjimnotail** = *false* or true. ← Set this to true if you want the *abjad* form of the number three to be ج – as in the manuscript tradition – instead of the modern usage ج.

Commands:

- ‣ \abjad and \abjadmaghribi (see section 9)

- ‣ \aemph to emphasize text with \overline. ← \textarabic{\aemph{اب}} yields اب. This command is also available for Farsi, Urdu, etc.

6.2 bengali

← **Options:**

- ‣ **numerals** = Western, Bengali or *Devanagari*
- ‣ **changecounternumbering** = true or *false* (use specified numerals for headings and page numbers)

6.3 catalan

Options:

- ‣ **babelshorthands** = *false* or true. ← Activates the shorthands "l and "L to type geminated l's.

Commands:

- ‣ \l.l and \L.L behave as in babel to type a geminated l, as in *col·laborar*. ←

In polyglossia the same can also be achieved with \l·l and \L·L.[7]

6.4 dutch

Options:

- ‣ **babelshorthands** = *false* or true. ← if this is turned on, all shorthands defined in babel for fine-tuning the hyphenation of Dutch words are activated.
  - ‣ "- for an explicit hyphen sign, allowing hyphenation in the rest of the word
  - ‣ "~ for a compound word mark without a breakpoint
  - ‣ "| disables the ligature at this position
  - ‣ "" is like "-, but produces no hyphen sign (for compound words with a hyphen, e.g., foo-""bar)

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[7]NB: · is the glyph U+00B7 MIDDLE DOT.

`\-`

> ‣ `"/` to enable hyphenation in two words written together but separated by a slash.
>
> ‣ In addition, the macro `\-` is redefined to allow hyphens in the rest of the word.

6.5 english

Options:
> ‣ **variant** = *american* (= us), usmax (same as 'american' but with additional hyphenation patterns), british (= uk), australian or newzealand
> ‣ **ordinalmonthday** = true/*false* (true by default only when variant = british)

6.6 esperanto

Commands:

`\hodiau`
`\hodiaun`

> ‣ `\hodiau` and `\hodiaun` are special forms of `\today` (see the babel documentation)

6.7 farsi

Options:
> ‣ **numerals** = western or *eastern*
> ‣ **locale** (not yet implemented)
> ‣ **calendar** (not yet implemented)

Commands:

`\abjad`
`\aemph`

> ‣ `\abjad` (see section 9)
> ‣ `\aemph` (see section 6.1).

6.8 german

Options:

v1.33.4

> ‣ **variant** = *german*, austrian or swiss. ← Setting variant=austrian or variant=swiss uses some lexical variants. With spelling=old, variant=swiss furthermore loads specific hyphenation patterns.
> ‣ **spelling** = *new* (= 1996) or old (= 1901): indicates whether hyphenation patterns for traditional (1901) or reformed (1996) orthography should be used. The latter is the default.
> ‣ **latesthyphen** = *false* or true: if this option is set to true, the latest (experimental) hyphenation patterns '(n)german-x-latest' will be loaded instead

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of 'german' or 'ngerman'. NB: This is based on the file `language.dat` that comes with TeXLive 2008 and later.

▸ **babelshorthands** = *false* or true: ← if this is turned on, all shorthands defined in babel for fine-tuning the hyphenation of German words are activated.

  ▸ `"ck` for `ck` to be hyphenated as `k-k`
  ▸ `"ff` for `ff` to be hyphenated as `ff-f`; this is also available for the letters l, m, n, p, r and t
  ▸ `"|` disables the ligature at this position
  ▸ `"-` for an explicit hyphen sign, allowing hyphenation in the rest of the word
  ▸ `""` is like `"-`, but produces no hyphen sign (for compound words with a hyphen, e.g., `foo-""bar`)
  ▸ `"~` for a compound word mark without a breakpoint
  ▸ `"=` for a compound word mark with a breakpoint, allowing hyphenation in the composing words.

  There are also four shorthands for quotation signs:
  ▸ `"`` ` for German left double quotes („)
  ▸ `"'` for German right double quotes (")
  ▸ `"<` for French left double quotes («)
  ▸ `">` for French right double quotes (»).

▸ **script** = *latin* or fraktur. ← Setting script=fraktur modifies the captions for typesetting German in Fraktur.

6.9 greek

Options:
  ▸ **variant** = *monotonic* (= mono), polytonic (= poly), or ancient
  ▸ **numerals** = *greek* or arabic
  ▸ **attic** = *false*/true

Commands:

`\Greeknumber`
`\greeknumber`
`\atticnumeral`
`\atticnum`

  ▸ `\Greeknumber` and `\greeknumber` (see section 9).
  ▸ The command `\atticnumeral` (= `\atticnum`) (activated with the option `attic=true`), displays numbers using the acrophonic numbering system (defined in the Unicode range U+10140–U+10174).[8]

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[8]See the documentation of the xgreek package for more details.

6.10 hebrew

Options:
- ‣ **numerals** = hebrew or *arabic*
- ‣ **calendar** = hebrew or *gregorian*

Commands:

`\hebrewnumeral`
`\hebrewalph`
`\aemph`

- ‣ \hebrewnumeral (= \hebrewalph) (see section 9).
- ‣ \aemph (see section 6.1).

6.11 hindi

v1.2.0

← **Options**:
- ‣ **numerals** = Western or *Devanagari*

6.12 italian

Option:

v1.2.0cc

- ‣ **babelshorthands** = *false* or true. ←Activates the " character as a switch to perform etymological hyphenation when followed by a letter, or other tasks when followed by certain analphabetic characters; in particular "" is used to enter double raised open quotes (the Italian keyboard misses the backtick), and "< and "> to insert open and closed guillemets without any spacing after the open or before the closed sign. "/ is made equivalent to / allowing a linebreak after the slash without any hyphen sign; "- produces a short rule/hyphen and a discretional line break alowing line breaks in the second compound word fragment.

6.13 korean

v1.40.0

← The language definition file includes U. S. hyphenation patterns in order to enable hyphenation when writing English within Korean text.

6.14 lao

v1.2.0

← **Options**:
- ‣ **numerals** = lao or *arabic*

6.15 latin

Options:

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▸ **variant** = classic, medieval or *modern*

6.16   lsorbian and usorbian

Commands:

\oldtoday   ▸ \oldtoday: see the babel documentation.

6.17   magyar

Commands:

\ontoday   ▸ \ontoday (= \ondatemagyar): special forms of \today (see the babel docu-
\ondatemagyar   mentation).

6.18   russian

Options:
    ▸ **babelshorthands** = *false* or true.
    ▸ **spelling** = *modern* or old (for captions and date only, not for hyphenation)

Commands:

\Asbuk   ▸ \Asbuk: produces the uppercase Russian alphabet, for environments such
    as enumerate

\asbuk   ▸ \asbuk: same in lowercase

6.19   sanskrit

Options:

v1.0.2   ▸ **Script** (default = Devanagari). ← The value is passed to fontspec in cases
    where \sanskritfont or \devanagarifont are not defined. This can be
    useful if you typeset Sanskrit texts in scripts other than Devanagari.

6.20   serbian

Options:
    ▸ **script** = *cyrillic* or latin

6.21   slovenian

Options:
    ▸ **localaph** = true *false*

6.22 syriac

Options:

- ▸ **numerals** = *western* (i.e., 1234567890), eastern (for which the Oriental Arabic numerals are used: ١٢٣٤٥٦٧٨٩٠), or abjad. ←.

Commands:

- `\abjadsyriac`   ▸ `\abjadsyriac` (see section 9)
- `\aemph`   ▸ `\aemph` (see section 6.1).

6.23 thai

Options:

- ▸ **numerals** = thai or *arabic*

To insert the word breaks, you need to use an external processor. See the documentation to thai-latex and the file `testthai.tex` that comes with this package.

6.24 ukrainian

Commands:

- `\Asbuk`   ▸ `\Asbuk`: produces the uppercase Ukrainian alphabet, for environments such as `enumerate`
- `\asbuk`   ▸ `\asbuk`: same in lowercase

6.25 welsh

Options:

- ▸ **date** = long or *short*

7 Modifying or extending captions and date formats

To redefine internal macros, you can use the command `\gappto` from the package etoolbox. For compatibility with babel the command `\addto` is also available with the same effect. For instance, to change the `\chaptername` for language `lingua`, you can do this:

`\gappto\captionslingua{\renewcommand{\chaptername}{Caput}}`

8 Non-Western decimal digits

Several scripts have their own versions of the decimal digits commonly called 'Arabic numerals'. With the appropriate language option set, polyglossia will automatically convert the output of internal LaTeX counters to their localized forms, for instance to display page, chapter and section numbers.

In previous versions this conversion was achieved my means of TECKit fontmappings. If needed they can be activated with the fontspec `Mapping` option, using `arabicdigits`, `farsidigits` or `thaidigits`. For instance if `\arabicfont` is defined with the option `Mapping=arabicdigits`, then by typing `\textarabic{2010}` one will obtain ٢٠١٠.

v1.1.1

With version v1.1.1 ← the same conversion is achieved directly by simple TeX macros. This prevents some problems that occur when the value of a counter has to be written and read from auxiliary files.[9] These macros (currently `\arabicdigits`, `\farsidigits` and `\thaidigits` are provided) are also available to the users. For instance in an Arabic environment `\arabicdigits{9182/738543-X}` yields ٩١٨٢/٧٣٨٥٤٣-X.

`\arabicdigits`
`\farsidigits`
`\thaidigits`

9 Alphabetic numbering in Greek, Arabic, Hebrew, Syriac and Farsi

In certain languages, numbers can be represented by a special alphanumerical notation.[10]

`\greeknumeral` The Greek numerals are obtained with `\greeknumeral` (or `\Greeknumeral` in
`\Greeknumeral` uppercase). Example: `\greeknumeral{1863}` yields ͵αωξγʹ.

`\abjad` The Arabic *abjad* numbers can be generated with the command `\abjad`. Example: `\abjad{1863}` yields غضسج. In the Maghrib the conventions are somewhat different, and the maghribi forms of the *abjad* numerals are obtained with the
`\abjadmaghribi` `\abjadmaghribi` command. Example: `\abjadmaghribi{1863}` yields شظصج.

The code for Hebrew numerals, which was incorrect in previous versions, was ported from the implementation in babel with v1.1.1 ←, and the user inter-

v1.1.1
`\hebrewnumeral`
`\Hebrewnumeral`
`\Hebrewnumeralfinal`

face is identical to the one in babel. The commands `\hebrewnumeral`, `\Hebrewnumeral` and `\Hebrewnumeralfinal` behave exactly as they do in babel: the second command prints the number with *gereshayim* before the last letter,

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[9]For instance the package lastpage did not work with polyglossia in situations where the display of counters was redefined to include a font-switching command.

[10]See, e.g., http://en.wikipedia.org/wiki/Greek_numerals, http://en.wikipedia.org/wiki/Abjad_numerals, and http://en.wikipedia.org/wiki/Hebrew_numerals.

and the latter uses in addition the final forms of Hebrew letters. Examples:
\hebrewnumeral{1750} yields א׳תשנ, \Hebrewnumeral{1750} yields א׳תש״נ, and
\Hebrewnumeralfinal{1750} yields א׳תש״ן.

Support is also provided for Syriac abjad numerals, which can be generated

\abjadsyriac   with \abjadsyriac.[11] Example: \abjadsyriac{463} yields ܬܣܓ.

10 Calendars

10.1 Hebrew calendar (hebrewcal.sty)

The package `hebrewcal.sty` is almost a verbatim copy of `hebcal.sty` that comes

\Hebrewtoday   with babel. The command \Hebrewtoday formats the current date in the Hebrew
calendar (depending of the current writing direction this will automatically set
either in Hebrew script or in roman transliteration).

10.2 Islamic calendar (hijrical.sty)

This package computes dates in the lunar Islamic (Hijra) calendar.[12] It provides
two macros for the end-user. The command

\HijriFromGregorian   \HijriFromGregorian{⟨year⟩}{⟨month⟩}{⟨day⟩}

\Hijritoday   sets the counters Hijriday, Hijrimonth and Hijriyear. \Hijritoday formats the

v1.1.1   Hijri date for the current day. This command is now locale-aware ←: its out-
put will differ depending on the currently active language. Presently polyglos-
sia's language definition files for Arabic, Farsi, Urdu, Turkish, Bahasa Indonesia
and Bahasa Melayu provide a localized version of \Hijritoday. If the formatting
macro for the current language is undefined, the Hijri date will be formatted in
Arabic or in roman transliteration, depending of the current writing direction.
You can define a new format or redefine one with the command

\DefineHijriDateFormat   \DefineHijriDateFormat{<lang>}{<code>}.

The command \Hijritoday also accepts an optional argument to add or
subtract a correction (in days) to the date computed by the arithmetical al-
gorithm.[13] For instance if \Hijritoday yields the date "7 Rajab 1429" (which is

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[11]A fine guide to numerals in Syriac can be found at http://www.garzo.co.uk/documents/syriac-numerals.pdf.

[12]It makes use of the arithmetical algorithm in chapter 6 of Reingold & Gershowitz, *Calendrical calculation: the Millenium edition* (Cambridge University Press, 2001).

[13]The Islamic calendar is indeed a purely lunar calendar based on the observation of the first visibility of the lunar crescent at the beginning of the lunar month, so there can be differences between different localities, as well as between civil and religious authorities.

the date that was displayed on the front page of aljazeera.net on 11th July 2008),
\Hijritoday[1] would rather print "8 Rajab 1429" (the date indicated the same
day on the site gulfnews.com).

10.3   Farsi (jalālī) calendar (farsical.sty)

This package is an almost verbatim copy of Arabiftoday.sty (in the Arabi package), itself a slight modification of ftoday.sty in FarsiTEX.[14] Here we have re-
named the command \ftoday to \Jalalitoday. Example: today is 6 Farvardīn
1395.

\Jalalitoday

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[14]One day I may rewrite farsical from scratch using the algorithm in Reingold & Gershowitz
(ref. n. 12).

12   More acknowledgements (by Arthur Reutenauer)

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