hafrorep

A LaTeX Class for Hafro Reports
Version 3.2 (2015-07-05)

Árni Magnússon & Sigurður Þór Jónsson

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1 Introduction

1.1 Background

Between 2003 and 2013, the annual stock assessment report "Ástandsskýrslan" (State of Marine Stocks in Icelandic Waters) was typeset in a 2-column format using Publisher. The table section was typeset in Word.

Overall, these MS Office tools proved inadequate for the job. Publisher tables were composite objects that broke when a new year was added, and were difficult to reassemble. The position of the header and page numbers tended to shift between pages. Instead of global document-wide settings, the typesetting approach in Publisher involved manually formatting a single object, paragraph, page, or chapter. The same shortcomings applied to the table section typeset in Word. The tables in Publisher and Word were difficult to modify, resulting in unexpected changes to the format. In the end, the table section in Word had become increasingly fragile, to the point that the document could not be opened, modified, and saved reliably.

In the spring and summer of 2014, experiments with typesetting Ástandsskýrslan in LaTeX were undertaken by Árni Magnússon (assessment section, LaTeX class) and Sigurður Þór Jónsson (table section, Sweave). The main findings were:

- LaTeX can mimic exactly the MS Office report format, both the overall 2-column layout and details like boxes and shades. This was the thrust of `hafrorep` version 1 which demonstrated the flexibility of LaTeX, and provided an option to switch from MS Office to LaTeX without debating potential changes to the report format.

- However, `hafrorep` version 1 also demonstrated that the 2-column layout is cumbersome to work with. Specifically when it comes to placement of figures and tables between and within paragraphs, fine-tuning vertical space to align columns, and constructing tables whose width is predefined to match the column width.

1.2 Design

The current design of `hafrorep` aims to make the writing of Ástandsskýrslan as easy as possible, both for chapter authors and editors, while retaining the high quality and recognizable style of the report series. This is achieved by adopting a 1-column layout, which greatly simplifies the typesetting, but affects the layout in several ways.

An established rule in typography dictates that an average line of text should be around 65 characters in books, and 75 characters in articles. Reports typeset in a 1-column layout tend to have longer lines, around 85 characters. To avoid even longer lines, the solution is to use a relatively large font and wide horizontal margins.

Most of the in-text tables and figures span roughly half the text width, with the caption on the side. Wider tables and figures are also supported, with the caption above the table and below the figure. Automatic LaTeX algorithms are utilized for the placement of tables and figures.

Compared to the 2-column layout of MS Office and `hafrorep` version 1, the output has larger text and a greater amount of white space. As a result, the report fills a larger number of pages, which is a drawback considering paper use. This drawback, however, is more than offset by a number of important benefits.

1.3 Benefits

1. Placement of tables and figures within each section, as well as the stretching of vertical spaces, is automated to a large degree. This used to be a time-consuming and frustrating process.

2. Document-wide settings apply uniformly across the entire report, resulting in fewer discrepancies between objects, paragraphs, pages, and chapters.

3. Cross-references to table and figure numbers are automated within the section.

4. Tables are much easier to update between years.

5. The table section corresponds to CSV (comma-separated values) files, which are archived and made available on http://data.hafro.is after the report is published. From there, they can be read directly into statistical software for analysis. This is particularly useful for retrospective and literate data analysis. It also makes it easier for anyone (ministry, stakeholders, media, analysts, etc.) to access stock assessment data and results, providing more open access of public information.

6. Since LaTeX uses text files, it is possible to track changes, undo, and backup using revision control. Files can be searched and compared using standard tools.

7. The compilation process is automated with scripts. The pathway from changing a sentence to creating a PDF of the entire report is now faster and less error-prone than the Publisher-Word-Acrobat tool chain, where 40 documents were opened manually and exported to postscript files, which were then manually dragged in the desired order.

8. Stock assessment scientists tend to use text files in their work, so `hafrorep` and CSV data files integrate the writing of Ástandsskýrslan with the assessment workflow.

9. LaTeX can be converted to other markup formats, such as HTML. It would require substantial work to produce clean and high-quality webpages (especially for the first time), but switching from MS Office to LaTeX would be a significant step in that direction.

The design of `hafrorep` focuses on the requirements of Ástandsskýrslan, but authors of other documents in the Hafró report series may find it useful as well.

1.4 Usage

The `hafrorep` class is used in the same way as `article`, `report`, and other standard LaTeX classes. Please note that:

- The `hafrorep.cls` must be in the same directory as the document, or made available to LaTeX in some other way.

- The document must be ASCII or UTF-8 encoded (not Latin-1).

- The degree character (˚) is allowed in documents, but the en dash character (–) and curly right single quote (') are not. Use two hyphens (--) and plain apostrophe (') instead.

- External files are organized in three subdirectories: `abs` (abstracts), `figs` (figures), and `tabs` (tables).

- Several LaTeX packages are required (see [Class dependencies], page 13).

- The document can be compiled with the `pdflatex` shell command.

1.5 Examples

The best way to learn how to use `hafrorep` is to experiment with examples. Three examples have been prepared for this purpose:

I – hello.tex

A minimal `hafrorep` document.

```
\documentclass{hafrorep}
\begin{document}
Hello world.
\end{document}
```

II – sael.tex

Icelandic text, UTF-8 encoded.

III – ufsi_2015 [directory]

Full-featured example from Ástandsskýrslan 2015.

The examples are available on the SVN repository,

```
svn export svn://svn.hafro.is/verk/hafrorep
```

and on the homepage:

```
http://www.hafro.is/~arnima/hafrorep
```

2 Options

2.1 english

english [User Option]

Use English grammar rules to split words between lines.

Example:

```
\documentclass[english]{hafrorep}
\begin{document}
A version of the Work that has been processed into a form where it is
directly usable on a computer system. This processing may include using
installation facilities provided by the Work, transformations of the
Work, copying of components of the Work, or other activities. Note that
modification of any installation facilities provided by the Work
constitutes modification of the Work.
\end{document}
```

3 Large objects

3.1 banner

\banner [Command]

    Automatic banner with section number and Icelandic species name.
    Example:

```
\banner
```

\bannerenglish [Command]

    Automatic banner with section number and English species name.
    Example:

```
\bannerenglish
```

\bannerx *prefix icelandic foreign* [Command]

    Banner with a *prefix*, followed by the title in *icelandic* and a *foreign* language.
    Example:

```
\bannerx\thesection\speciesIS\speciesLA
```

\bigbanner *top middle bottom* [Command]

    Banner with three centered lines of text: *top*, *middle*, and *bottom*.
    Example:

```
\bigbanner
{Ágrip af skýrslu Hafrannsóknastofnunar}
{um nytjastofna sjávar 2012/2013 og}
{aflahorfur fiskveiðiárið 2013/2014}
```

3.2 painting

\painting *file width xypos* [Command]

    Image *file* from inside the `figs` directory, stretched to *width* and placed at *xypos*.
    Example:

```
\painting{ufsi}{4.3cm}{12.4cm,4.7cm}
```

3.3 figmap

\figmap *file position icelandic english* [Command]

Figure showing a map image *file* from inside the `figs` directory, placed at a given *position*, with a caption in *icelandic* and *english*.

Example:

```
\figmap{aflamynd_2012_3}{htbp}
{Veiðisvæði við Ísland árið 2012.}
{Fishing grounds in 2012.}
```

\figmapx *file position boldIS normIS boldEN normEN* [Command]

Like **\figmap**, except Icelandic caption is passed as *boldIS* and *normIS*, and English caption as *boldEN* and *normEN*.

Example:

```
\figmapx{aflamynd_2012_11_efri}{htbp}
{Úthafskarfi, efri stofn.}
{Veiðisvæði íslenskra skipa árin 2001---2012.}
{Shallow pelagic redfish.}
{Fishing grounds of the Icelandic fleet in 2001---2012.}
```

3.4 fignum

\fignum *file label position icelandic english* [Command]

Figure showing an image *file* from inside the `figs` directory, tagged with a *label*, placed at a given *position*, with a caption in *icelandic* and *english* on the side of the figure.

Example:

```
\fignum{ufsi_catch}{fig:landings}{htbp}
{Landaður afli eftir veiðarfærum.}
{Landings by gear type.}
```

\fignumx *file label position boldIS normIS boldEN normEN* [Command]

Like **\fignum**, except Icelandic caption is passed as *boldIS* and *normIS*, and English caption as *boldEN* and *normEN*.

Example:

```
\fignumx{atumagn}{fig:plankton}{htbp}
{$\!\!$}
{Átumagn (g þurrvigt m\super{--2}, 0---50 m) að vorlagi.}
{$\!\!$}
{Zooplankton biomass (g dry weight m\super{--2}, 0---50 m) in spring.}
```

3.5 figcenter

\figcenter *file label pos figwidth capwidth icelandic english* [Command]

Centered figure showing an image *file* from inside the `figs` directory, tagged with a *label*, placed at a given *pos*, a size of *figwidth* and *capwidth*, with a caption in *icelandic* and *english* below the figure.

Example:

```
\figcenter{raekja_grunn}{fig:inshore}{htbp}
{\textwidth}{0.95\textwidth}
{Afli (lína) og vísitala stofnstærðar (súlur) á grunnslóð.}
{Inshore catch (line) and biomass indices (columns).}
```

\figcenterx *file lab pos fwidth cwidth bIS nIS bEN nEN* [Command]

Like **\figcenter**, except Icelandic caption is passed as *bIS* and *nIS* (bold and normal), and English caption as *bEN* and *nEN*.

Example:

```
\figcenterx{signlunes50ts}{fig:salinity}{htbp}
{0.8\textwidth}{0.75\textwidth}
{$\!\!$}
{Hiti og selta að vori á 50 m dýpi á stöð 3.}
{$\!\!$}
{Temperature and salinity in spring at 50 m depth at station 3.}
```

4 Small macros

4.1 Section

\chapter   [Command]
    Chapter heading, not inside a banner.

\chapterx   [Command]
    Chapter heading, not inside a banner and not numbered.

\abstracts   [Command]
    Insert abstracts into document (`is.tex` and `en.tex` inside subdirectory `tabs`).

\hafrochapter *number icelandic english page*   [Command]
    TOC entry for chapter *number* with an *icelandic* and *english* title, and a *page* number.

\hafrochapterm *number title page*   [Command]
    TOC entry for chapter *number* with a *title* and a *page* number, in medium font weight.

\hafrochapterx *number title page*   [Command]
    TOC entry for chapter *number* with a *title* and a *page* number.

\hafrosection *number icelandic english page*   [Command]
    TOC entry for section *number* with an *icelandic* and *english* title, and a *page* number.

\hafrosectionx *number title page*   [Command]
    TOC entry for section *number* with a *title* and a *page* number.

4.2 Table

\h   [Command]
    Shorthand for **\hspace**.

\I *height*   [Command]
    Establish *height* to increase vertical space above.

\m   [Command]
    Shorthand for **\multicolumn**.

\mc *label*   [Command]
    Centered column *label*.

\mci *label*   [Command]
    Centered italic column *label*.

\mcI *label*   [Command]
    Centered column *label* followed by a vertical line.

\mciI *label*   [Command]
    Centered italic column *label* followed by a vertical line.

\ml *label*   [Command]
    Left-aligned column *label*.

\mli *label*   [Command]
    Left-aligned italic column *label*.

\mlI *label* [Command]
    Left-aligned column *label* followed by a vertical line.

\mliI *label* [Command]
    Left-aligned italic column *label* followed by a vertical line.

\p [Command]
    Shorthand for **\phantom**.

\s [Command]
    Shorthand for **\super**.

\tabsection [Command]
    Table section number.

\pathstamp *url1* [*url2*] [Command]
    Stamp URL(s) at the bottom of the page.

4.3 Character

\b [Command]
    Boldface.

\i [Command]
    Italic.

\f *number* [Command]
    Footnote *number*.

\super *text* [Command]
    Superscript *text*.

\superi *text* [Command]
    Superscript *text* with alternative kerning.

\sub *text* [Command]
    Subscript *text*.

5 User guidelines

5.1 Species name

The species name is defined in the preamble of each section in three languages (Icelandic, English, and Latin), using the macros \speciesIS, \speciesEN, and \speciesLA.
Example:

```
\renewcommand\speciesIS{Ufsi}
\renewcommand\speciesEN{Saithe}
\renewcommand\speciesLA{Pollachius virens}
```

These macros are used internally by hafrorep to produce banners and figure captions. They are also used manually to produce table captions.

5.2 Cross-references

Table and figure numbers inside each section are cross-referenced using the \ref{*label*} command, which automatically produces the correct table and figure number.
Example:

```
tafla \ref{tab:advice}    =>   tafla  2.3.1
mynd \ref{fig:landings}   =>   mynd   2.3.1
```

Table numbers from the table section, on the other hand, are cross-referenced using the \tabsection command, which produces the correct prefix, but the author must specify the correct table number.
Example:

```
tafla \tabsection.1       =>   tafla  3.3.1
```

5.3 Constructing a table

When constructing a table in a document, the following guidelines apply:

1. If the table can be made narrow, it saves space in the report to put the caption on the side, instead of above the table. To make the table narrow enough, adjust `\tabcolsep` until the table caption width is equal to figure captions.

2. All tables within a chapter are typeset using the `\floatbox` command from the floatrow package. It has the following form:

   ```
   \floatbox[\capbeside]{table}[\FBwidth]
   {\caption{...}\label{...}}
   {\begin{tabular}...\end{tabular}}
   ```

   for a side caption, or replacing `\capbeside` with `\captop` for a top caption.

3. When numeric columns contain entries of unequal length, they are left-aligned or right-aligned, but at the same time also shifted by a fixed indentation so the numbers end up close the center of the column. This indentation (within columns) is specified using directives like `<{\hspace{`*length*`}}` that are provided by the array package.

4. Column labels are specified with `\mc`, `\mci`, and other shorthand notations (see [table macros], page 8), where 'c' means centered, 'l' means left-aligned, 'i' means italic, and 'I' produces a vertical line.

5. Vertical space is controlled using the `\I{`*length*`}` command for the space above a given row, and the `\\[`*length*`]` command for the space below.

6. Footnote numbers can be formatted using the shorthand command `\f`.

It is challenging to construct a table for the first time, but very easy to update a table from a previous report (modify the numbers or add one more line).

6 Acknowledgements

Þorsteinn Sigurðsson and Birkir Bárðarson have grumbled about the shortcomings of MS Office for typesetting Ástandsskýrslan over the years. Their detailed criticism served as the initial blueprint for `hafrorep`.

Gunnar Gunnarsson (at Orkuveita Reykjavíkur) evaluated `hafrorep` 1.1 and made valuable suggestions that led to version 2.0.

Kristján Kristinsson provided the solution to format enumerated lists with minimal vertical spacing, incorporated in version 2.12.

Birkir Bárðarson reported a bug in the table of contents dots, fixed in version 2.14.

Appendix A Dependencies

The `hafrorep` class requires the following LaTeX packages:

Character
- babel
- inputenc
- fontenc

Page
- geometry

Header and footer
- color
- fancyhdr

Table of contents
- tocloft

Section
- tikz
- titlesec

Paragraph
- multicol

List
- enumitem

Table
- array
- rotating

Figure
- graphicx
- textpos

Caption
- caption
- floatrow

Appendix B Release history

Version 3.2

5 July 2015

- New document option [english].

Version 3.1

4 July 2015

- Equal spacing between dots in table of contents.
- New commands: \bannerenglish, \hafrochapterm, \hafrosectionx.

Version 3.0

16 June 2015

- \abstracts clears floats before inserting the abstracts.
- \banner takes zero arguments, breaking backward compatibility.
- \pathstamp inserts blank lines before and after the textblock, to prevent warnings.
- Page numbers in table of contents are never bold.
- New commands: \bannerx, \s.

Version 2.14

10 June 2015

- Dots in table of contents are slanted, and not bold.
- New command: \pathstamp.

Version 2.13

9 June 2015

- Table of contents uses slanted letters.
- Depends on package multicol.

Version 2.12

7 June 2015

- French spacing used everywhere.
- Enumerated lists with minimal vertical spacing.
- New commands: \abstracts, \h, \hafrochapter, \hafrochapterx, \hafrosection, \p.
- Removed command: \u.
- Depends on packages enumitem, rotating, tocloft.
- Does not depend on package ulem.

Version 2.11

22 April 2015

- En dash character (U+2013) and curly right single quote (U+2019) in document give error messages.

Version 2.10

20 April 2015

- Default caption format is 'tabcap', to simplify table input files.

Version 2.9

18 April 2015

- Degree symbol can be used in LaTeX input file, without special commands.

Version 2.8

18 April 2015

- Tables can have caption on the side.
- All floats support the [H] placement option.
- Depends on package floatrow.
- Does not depend on packages float, sidecap.

Version 2.7

15 April 2015

- Does not depend on package subscript, which is unavailable for MiKTeX.

Version 2.6

12 April 2015

- Depends on package subscript.

Version 2.5

12 April 2015

- New command: \superi.

Version 2.4

10 April 2015

- Top banner is boxed and shaded.
- New commands: \bigbanner, \chapter, \chapterx, \figcenter, \figcenterx, \figmapx, \fignumx.
- Depends on packages float, tikz.

Version 2.3

26 September 2014

- Increased horizontal margins.

Version 2.2

22 September 2014

- New command: `\sub`.

Version 2.1

13 September 2014

- Increased top margin.
- French spacing in figure captions.

Version 2.0

12 September 2014

- Everything simplified, not backward compatible with version 1.
- 1-column layout, Computer Modern 11 pt font.
- Tables and figures float automatically.
- Top banner is plain (not boxed, not shaded).
- Tables are plain (not boxed, no fixed width, no background color).
- Figures are plain (not boxed, not shaded), caption is beside the figure, and vertical spacing is automatic.
- New commands: `\m`, `\mci`, `\mciI`, `\ml`, `\mli`, `\mlI`, `\mliI`, `\speciesIS`, `\speciesEN`, `\speciesLA`.
- Removed commands: `\pause`, `\newcolumn`, `\mIc`, `\mIcI`, `\mIlI`.
- Depends on packages array, caption, color, sidecap, titlesec.
- Does not depend on packages indentfirst, multicol, tabularx, tikz, txfonts, xcolor.

Version 1.1

12 September 2014

- New command `\u`.
- Depends on package ulem.

Version 1.0

12 June 2014

- Initial release, mimics the previous 2-column layout exactly.