The artmacs package*

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Abstract

This collection of packages and commands serves (at least) two purposes: 1. aid in the drafting process and 2. produce the layout we prefer (mainly inspired by the Computational Complexity class) when finalizing. We base everything on the article class for maximal portability. None of the packages is by me – see the list of packages

make this a section in the appendix

for the respective authors. My only contribution is the selection, arrangement, and choice of compatible options.

Contents

*This document corresponds to artmacs v0.2.11, dated 2014/11/27.

Advice for editing. First, for `ltxdoc.cls` we have set todos `inline`, since our default settings extend to half of the linewidth. Second, remember that `verbatim`-content cannot go in the argument of *any* command. (The `ltxdoc.cls` loads `doc.sty` to provide the "shortverbatim" via the pipe – this is also available as standalone package `shortvrb.sty`.)

1 Options for this package

```
\newif\ifOptBeamer\OptBeamerfalse
\newif\ifOptLlncs\OptLlncsfalse
\newif\ifOptSigAlterFix\OptSigAlterFixfalse
\newif\ifOptChapter\OptChapterfalse

\newif\ifOptThm\OptThmtrue
\newif\ifOptGraphicx\OptGraphicxtrue
\newif\ifOptHyperref\OptHyperreftrue
\newif\ifOptNatbib\OptNatbibtrue
\newif\ifOptKeywords\OptKeywordstrue
\newif\ifOptCMFonts\OptCMFontstrue
\newif\ifOptNgerman\OptNgermanfalse

\newif\ifOptStrict\OptStrictfalse

\DeclareOption{beamer}{\OptBeamertrue\OptThmfalse\OptKeywordsfalse\OptHyperreffalse\OptCMFontsf
\DeclareOption{elsarticle}{\OptNatbibfalse\OptGraphicxfalse}
\DeclareOption{sig-alternate}{\OptKeywordsfalse\OptSigAlterFixtrue}
\DeclareOption{llncs}{\OptLlncstrue}
\DeclareOption{classicthesis}{\OptHyperreffalse\OptCMFontsfalse}
\DeclareOption{numberwithinchapter}{\OptChaptertrue}
\DeclareOption{ngerman}{\OptNgermantrue}

\DeclareOption{strict}{\OptStricttrue}
```

Now, all options are defined. We execute the default options.

```
\ProcessOptions\relax

\ifOptBeamer
\RequirePackage{etex}
\reserveinserts{28}
\fi
```

2 Good style

2.1 Check your syntax with nag

Technically, `nag` should be loaded even before `\documentclass`, but that seems hard (and not necessary). By default, they return warnings, the `strict`-option turns these into errors.

```
\ifOptStrict
\RequirePackage[l2tabu,orthodox,abort]{nag}
\else
\RequirePackage[l2tabu,orthodox]{nag}
\fi
```

Style Joachim deprecates (defined via nag). `mysetminus` due to Andrew Swann on tex.stackexchange. This draws a tikz-picture every time (!) `\mysetminus` is employed. Andrew Swann also gives a `savebox`-version that only draws once, but then you need to use `pt` instead of `em` and appropriate scaleboxes?!

```
\newcommand*{\mysetminusD}{\hbox{\tikz{\draw[line width=0.06em,line cap=round] (0.3em,0) -- (0,
\newcommand*{\mysetminusT}{\mysetminusD}
\newcommand*{\mysetminusS}{\hbox{\tikz{\draw[line width=0.045em,line cap=round] (0.2em,0) -- (0
\newcommand*{\mysetminusSS}{\hbox{\tikz{\draw[line width=0.04em,line cap=round] (0.15em,0) -- (

\newcommand*{\mysetminus}{\mathbin{\mathchoice{\mysetminusD}{\mysetminusT}{\mysetminusS}{\myset

\ObsoleteCS[ugly]{setminus}{\protect\mysetminus}
\ObsoleteCS[ugly]{emptyset}{\protect\varnothing}
\ObsoleteCS[bad style]{len}{\protect\abs}
```

No more plain TEX and only AMS environments.

```
\ifOptStrict
\RequirePackage[all, error]{onlyamsmath}
\else
\RequirePackage[all, warning]{onlyamsmath}
\fi
```

TODO `textrm` is also bad style and should be `text` (in math) or `textnormal` (in text). But this is used by so many packages and bibstyles that we turn this off for the moment.

3 Packages loaded

3.1 Language, Fonts and Layout

`babel` We always load both english and (n)german. We make english the default (last option) unless, this package loads with option `ngerman`: then ngerman is the default. In either case, you can switch (after `\begin{documents}`) with `\selectlanguage{ngerman}` or `\selectlanguage{english}`, respectively. (Alternatives for single words and blocks are `\foreignlanguage{<language>}{<text>}`

and `\begin{otherlanguage*}{<language>} <text> \end{otherlanguage*}`, respectively.)

```
\ifOptNgerman
\RequirePackage[english,ngerman]{babel}
\else
\RequirePackage[ngerman,english]{babel}
\fi
\addto\extrasngerman{\sisetup{locale=DE}}
```

`fontenc`

```
\RequirePackage[T1]{fontenc}
\ifOptCMFonts
\RequirePackage{lmodern}
\else
\ifOptBeamer
\RequirePackage[scaled]{helvet}
\fi
\fi
```

to use 8-bit fonts instead of default (OT1) 7-bit fonts. This makes Umlauts, etc. available and proper kerning and glyphs possible.

Using Latin Modern, derived from Computer Modern providing

- revised metrics
- more glyphs, especially diacritical characters
- several extra fonts (like sans-serif boldface math)
- extra symbols (like proper «guillemots»).

You can check the used fonts with `$ pdffonts file.pdf`.

For beamer presentations we prefer (scaled) Helvitica as sans-serif (i.e. default text) font over CM Sans.

`txfonts.sty` `pxfonts.sty` Maybe some sort of times roman, but discouraged for its lack of support for amsmath. (according to mathtools.pdf) Same goes for `pxfonts`.

3.2 Colors and graphics

Before loading todonotes, we load some packages, where we want to select some options that todonotes would set otherwise to default.

Say something about tikz & PSTricks here.

`xcolor` Change fontcolor within a group with `\color{red}` or set colors in TikZ with `fill=red!20`.

```
\ifOptBeamer
\else
\RequirePackage[svgnames]{xcolor}
\fi
```

The option `svgnames` adds plenty to the 19 predefined names. In particular many variants with "Dark"/"Light"-prefix. Note: In comparison to the `color`-package, its documentation states: "Its purpose can be summarized as to maintain the characteristics of color, while providing additional features and flexibility with (hopefully) easy-to-use interfaces." This package is automatically loaded by `beamer`.

`graphicx` l2tabu: Use `graphicx.sty` instead of `epsf.sty`, `psfix.sty` or `epsfig.sty`. Alternatively `graphics.sty`. See `texdoc graphicx` for differences. Since we choose `latex/dvips/ps2pdf` over `pdflatex`, we specify option `dvips` and are restricted to `eps` and `ps` graphics. Switches for `pdflatex` – with respect to arxiv – are on the todo list; requires option `pdftex` and also modifications to hyperref.

```
\ifOptGraphicx
\RequirePackage[final]{graphicx}
\else
\fi
```

We want to display figures/pictures even in draft mode. Then `auto-pst-pdf` doesn't work any more, because `final` forces compilation here (overriding `off`) and we have to enable Shell-escape every time. That's annoying. But hopefully, there won't be too much auto-pst-pdf in the future.

We can't load `graphicx` with this option for `beamer`, because it gets loaded later (at least, when `tikz` is loaded) and then we have an option clash.

3.3 develop, draft and edit

`todonotes` allows todo-marks with `\todo[]{}` and a list of todos with `\listoftodos`, switched on and off by global option `draft` and `final`, respectively.

```
\ifOptBeamer
\else
\ifOptLlncs
\RequirePackage[linecolor=black,backgroundcolor=white,textsize=tiny,obeyDraft,obeyFinal]{todono
\else
\RequirePackage[linecolor=black,backgroundcolor=white,textsize=tiny,textwidth=2.5\marginparwidt
\fi
\fi
\RequirePackage{tikz}
\makeatletter
\let\@@tikzpicture\tikzpicture
\def\tikzpicture{\catcode`\$=3 \@@tikzpicture}
\makeatother
```

Using `\url` or `\verb` in todonotes requires `\protect`; try this for `\eqref`, too. The margins (position, not only size) seem to be defined substantially different for article class and llncs class. So, we better not modify the textwidth in the letter becaus this yields bad layout.

Todonotes will load `tikz` and `xcolor` – if we have selected the beamer option, we load `tikz` manually. We need to adjust the charactercode of `$` within tikzpicture, because later `onlyamsmath` will make `$` active to check for `$$` – this confuses tikz's `calc` package. Todonotes is a really heavy package, loading lots of stuff (I guess

almost the complete Tikz-stuff and also graphicx). It also seems to set options for the graphicx package to be loaded later.

The title "List of Todos" used to have problems with `natbib` and the (ugly) fix was `\makeatletter\let\chapter\@undefined\makeatother` which in turn conflicted with `algorithm2e`, so had to be loaded after that. But, ultimately, disabling chapters is just no good idea (for classes like `book` and `llncs` – who defines the tableofcontents as chapter). So, we are happy that at the moment, the problem seems to have vanished and we can just ignore that.

In case the todonotes package breaks again, the following two lines neutralize its commands:

```
\newcommand*{\todo}[1]{}
\newcommand*{\listoftodos}{}
```

Alternatively, try the package `todo`, which requires fewer other packages, but seems incompatible with the environments of the cc-class. How to switch it off? Process all todos? – Does an empty list occur?

`showkeys` Modifies `\label`, `\ref`, `\pageref`, `\cite` and `\bibitem` to show the internal keys.

86 `\RequirePackage[notref,notcite]{showkeys}`

Switch off by global option `final`. (Default is option `draft`.) We choose option `notref`, because this omits the keys on `\ref`, where they are not of interest anyways and prevents a bug when `\autoref` occurs at the beginning of a `theorem` environment (effectively dropping the environment).

We also switch off the redefinition of `\cite` with `notcite`, since the information with `\bibitem` is sufficient – and also the cites caused "out of memory" errors, when the package was loaded *before* `natbib`. The other fix would have been to load it afterwards, but as we decided that we don't need them anyways, we can just as well keep in it in the "development" section.

This package may conflict with `hyperref`. The `hyperref` manual suggests to load (hyperref) with the option `implicit=false`, tex.SE claims that this is one of the few packages that should be loaded *after* `hyperref`.

check that

`refcheck` looks for useless labels, unlabelled equations, unused bibliography and puts keys of labels in the margin. (Todo: Find out how this works with the also loaded `showkeys`).

87 `%\RequirePackage{refcheck}`

Switch off printing by option `norefs`. (Default is `showrefs`.) Useless labels are underlined and bounded by '¿. The mark '{?}' means that the equation is unlabelled. Marks are framed for labels used in the text. The same goes for the bibliography. Switching off the behavior there by the option `nocites`. (Default is `showcites`.) Checking for unlabelled equations can be switched off by `ignoreunlbld`. (Default is `chkunlbld`.) Note: `refcheck` works with AMS-LaTeX and `hyperref`, but they have to be loaded *before*. (Todo: Do this.) Status: Put on hold, since mathtools seems to make it unnecessary to check for unreferenced labels.

prelim2e Puts date and time under a draft.

```
\RequirePackage[scrtime]{prelim2e}
```

where the option `scrtime` of the koma-script package computes the time. The option `draft` is default, the option `final` produces no output

```
\renewcommand*{\PrelimWords}{Draft (\jobname)}
```

changes the text from the default "Preliminary version" to "Draft".

3.4 AMS environments

amsmath

```
\RequirePackage{amsmath}
```

We fine-tune the theorem environments with `thmtools`. `amsthm` (or `ntheorem`) is a prerequisite for that. The command `numberwithin` makes counters "within" a certain section/part of a document. We do this for all counters (also for floats) and make them all point to the equation counter.

thmtools.sty collection of tools and enhancements for theorem environments

```
\ifOptThm
\ifOptLlncs
\else
\ifOptChapter
\numberwithin{equation}{chapter}
\numberwithin{figure}{chapter}
\numberwithin{table}{chapter}
\else
\numberwithin{equation}{section}
\numberwithin{figure}{section}
\numberwithin{table}{section}
\fi

\makeatletter
\let\c@figure\c@equation
\let\c@table\c@equation
\makeatother
\fi

\let\proof\relax
\let\endproof\relax

\ifOptLlncs
\makeatletter
\let\c@corollary\c@equation
\let\c@lemma\c@equation
\let\c@proposition\c@equation
\let\c@theorem\c@equation
\let\c@conjecture\c@equation
\let\c@definition\c@equation
```

```
\let\c@example\c@equation

\let\c@remark\c@equation
\makeatother

\spnewtheorem{fact}[theorem]{Fact}{\bfseries}{\itshape}
\spnewtheorem{assumption}[theorem]{Assumption}{\bfseries}{\itshape}

\spnewtheorem{openquestion}[theorem]{Open Question}{\bfseries}{\rmfamily}

\else
\RequirePackage{amsthm}
\RequirePackage{thmtools}

 % default style=plain
\declaretheorem[sibling=equation]{claim}
\declaretheorem[sibling=equation]{corollary}
\declaretheorem[sibling=equation]{conjecture}
\declaretheorem[sibling=equation]{fact}
\declaretheorem[sibling=equation]{lemma}
\declaretheorem[sibling=equation]{proposition}
\declaretheorem[sibling=equation]{theorem}

\declaretheorem[sibling=equation, style=definition]{assumption}
\declaretheorem[sibling=equation, style=definition]{definition}

\declaretheorem[sibling=equation, style=remark]{example}
\declaretheorem[sibling=equation, style=remark]{remark}
\declaretheorem[sibling=equation, style=remark, name=Open Question]{openquestion}
\fi

\fi
```

The package `thm-autoref` of this bundle is supposed to fix `hyperref`'s problems for the `\autoref` command, when different theorem-style environments share the same counter. The fix with `aliascnt` seems necessary and sufficient.

Some documentclasses (like sig-alternate) define a proof-environment. We want to the version of `amsthm` and therefore undefine any previous proof definitions.

The CTAN-version of `thmtools` is outdated. Get the current version from `http://www.absatzen.de/thmtools.html`.

what is the effect of definition-style?

We have to be careful, while defining theorem-like environments, since some (most) packages already define their share.

beamer uses `note` to place annotations between slides and has trouble with the other environments, too (?!). We would really produce nice blocks automatically, but right not it's faster to just disable all theorem-like environments and use `block`.

turn theorem-environments into proper blocks for beamer

sig-alternate only defines `proof`, so we just undefine that.

llncs predefines almost all environments that we use (fortunately also all lowercase) and we just add `fact`, `assumption`, and `open question`.

never checked whether proof still works – requires explicit qed-symbol. Fix that, when you need it.

check whether your list of environments is MECE.

theorems and equations share the same counter; to make the latter display the section number we use `numberwithin`.

3.5 environments "keywords" and "AMS" for compatibility

sec:keywords

two more environments for compatibility

```
\ifOptKeywords
\newenvironment*{keywords}{\textbf{Keywords.}}{}
\newenvironment*{AMS}{\textbf{2010 Mathematics Subject
    Classification.}}{}
\fi
```

4 Typsetting Math

4.1 Display Math

NEVER: `$$ ... $$`, since this is TEXand leads to inconsistent vertical spacing (l2tabu and amsldoc).

CAVE: No `displaymath`, if `amsmath.sty`

CAVe: No `eqnarray(*)` at all.

4.1.1 single line

`equation` `equation*`

`equation` resp. `equation*` (equivalently `\[ .. \]` as defined in the last lines of `amsmath.sty`)

CAVE: The last two possibilities are substitutes for `displaymath` which is no longer supported, when `amsmath.sty` is loaded.

`multline`

the `multline`-environment behaves like the `equation`-environment, but on several lines, putting the first line left-aligned, the last right-aligned and all in between centered.

4.1.2 several lines

`gather` `gather*` `align` `align*`

without alignment

with alignment

4.1.3 split into several lines within another environment

`split` using `&`.

4.2 Punctuation at the end of equations ...

... should be separated by a small space `\,` from the final punctuation mark.

We allow page breaks in multiline displays by

```
159 \allowdisplaybreaks[4]
```

The command `\\*` can be used to prohibit a pagebreak after a given line. Note: Certain environments wrap their contents in an unbreakable box, prohibiting that effect. These include `split`, `aligned`, `gathered`, and `alignedat`.

4.3 mathtools.sty as extension to amsmath

`mathtools.sty` Remark: `amsmath` should already be loaded at this point – otherwise `mathtools` will do so. Loading `amsmath` afterwards is not necessary – and probably a bad idea.

An extension to amsmath providing some bug fixes and also some features. It therefore requires `amsmath` – and would load it if not already done. It also passes its options to `amsmath`.

```
160 \RequirePackage{mathtools}
161 \mathtoolsset{showonlyrefs, showmanualtags, mathic}
```

Per default, two options are set, namely `fixamsmath` to fix two bugs in amsmath and `disallowspaces` to prevent a first line in an equation starting with `[p]` to be interpreted as optional argument to the environment.

Three commands for better typesetting of operators: `<op>_{\mathclap{limit}}` puts the limit in a box of size zero; if you want to apply this to sub- and superscript, it is quicker to use just `\smashoperator{<op>_foo^bar}` (in general, I like the previous syntax better, because it doesn't "hide" the operator). Finally, for two consecutive operators (e.g. limits), you want `\adjustlimits{ <op1>_<limit1> <op2>_<limit2>}` to align the limits vertically (if their heights differ).

The option `showonlyrefs` shows only labels for referenced equations, but you have to use `eqref`. While `showmanualtags` shows the labels specified by `\tag` or `\tag*`. (If you do not show them, then why would you define them?!) If you would like to add labels to unreferenced equations, use `\noeqref{<label>}` analogously to `\nocite`. Unfortunately, this `showonlyrefs` introduces two bugs: First, the formula might be set "across" the equation number (because it is initially not present, when the equation is typeset). Second, conflicts with the `ntheorem` package. The easist fix is `\usepackage[overload,ntheorem]{empheq}` before loading `ntheorem`, but we don't need that, since we don't use `ntheorem`.

Math within italics text comes with automatic italic correction at the end, but not at the beginning, so that the right space in textit-math-textit is too wide. The `mathic`-option also adds the italic correction to the beginning, but requires typesetting a la `\(math\)` instead of `$math$` to do so.

The standard implementations for `\underbrace` and `\overbrace` have some deficiencies: all lengths are fixed and optimized for 10 pt typesetting. `mathtoolsset` redefines them and also adds `\underbracket` and `\overbracket`.

This package also adds more extensible arrows to the ones already in the `amsmath` package, like `\xRightarrow[sub]{sup}` or `\xmapsto[sub]{sup}`.

Starred versions of the matrix environments (matrix, pmatrix, bmatrix, Bmatrix, vmatrix, Vmatrix), are available, like `\begin{pmatrix*}[col]...\end{pmatrix*}` where the one optional argument `col` specifies the alignment of the columns. Default is `c`, but sometimes `r` might be nicer.

`mathtools` provides the command `\vcentcolon` for a vertically centered colon before an equal sign. Such a symbol is also provided by `\coloneqq` from the packages `txfonts` and `pxfonts`, but with tighter spacing. Also, these packages lack the support for `amsmath` and the side-bearings are way too tight.

Furthermore, `mathtools` provides the missing symbol `\bigtimes`.

Quite handy are the two environments `cases*` and `dcases*`, where the starred version typesets the second column in the normal roman font of the document (more precisely it inherits the font characteristics before the cases environment). This spares the repeated use of `\text{...}`. The `dcases*` (and also `dcases`) environment display the rows in display- rather than inline-style, i.e. larger.

`\boxed` generates a box in math mode, but this does not work across alignment points. For this use, `mathtools` defines `\Aboxed{<left> & <right>}`.

For vertical lines in `align` environments, use a line like `& \vdotswithin{=} \\` or simply `\shortvdotswithin{=}`.

`\intertext` gets the little brother `\shortintertext{<text>}` using less excessive spacing.

Introduces `\DeclarePairedDelimiter` for maximal flexibility when defining `\abs`, etc. Then you can use `\abs*` for the variant with `\left` and `\right` and `\abs[\Bigg]` for, well, the correspondingly modified version.

`\prescript` Usage `\prescript{sup}{sub}{arg}` to typeset chemical elements and generally put indices or exponents on the left of a symbol . Example `\prescript{14}{2}{C}_{2}^{5+}`.

4.4 Cross-references with hyperref.sty

`hyperref.sty` The hyperref package extends the functionality of the LaTeX cross-referencing commands to produce commands which a driver can turn into hypertext links; it also provedes new commands to allow the user to write hypertext links to external documents and URLs. We *always* want that package, but some document classes (beamer, classicthesis) load it already with conflicting options and we have to handle the configuration wtih hypersetup. That's we – depending on the option of the artmacs-package – hyperref is loaded (explicitly) or assumed (implicitely). TODO: if we can move all loading options of hyperref to hypersetup, we don't need that distinction any more, I guess?!

We definitely want the option `final`, because in `draft` hyperlinking is turned of and we might surprised when transitioning to the final version. We once had a fancy backref solution from classicthesis. It's an overkill for short articles. If

you ever want to turn it back on, a quick solution is the option `backref=page` to hyperref.

```
\PassOptionsToPackage{hyphens}{url}

\ifOptHyperref
\RequirePackage[
final,
pdfpagelabels=true,    % rumor has it: beamer does not like that
]
{hyperref}

\else
\RequirePackage{bookmark}

\fi

\hypersetup{%
linktocpage=false,    % headlines (not page numbers) are links
pdfborder={0 0 0},    % no boxes around links
breaklinks=true,      % linebreak -- otherwise ugly
bookmarksnumbered=true,
pdfstartpage=3, pdfstartview=FitV,%
    pdfpagemode=UseNone, pageanchor=true, pdfpagemode=UseOutlines,%
    plainpages=false, bookmarksopen=true, bookmarksopenlevel=1,%
    hypertexnames=true, pdfhighlight=/O,%nesting=true,%frenchlinks,%
}

\hypersetup{
colorlinks=true,%
linkcolor=black,%RoyalBlue
citecolor=black,%webgreen
filecolor=black,%
urlcolor=black,%webbrown
}

\DeclareUrlCommand\email{\urlstyle{tt}}
\DeclareUrlCommand\directory{\urlstyle{tt}}

\makeatletter
\newcommand*{\pdftitle}[1]{\gdef\@pdftitle{#1}}
\newcommand*{\pdfauthor}[1]{\gdef\@pdfauthor{#1}}
\newcommand*{\pdfkeywords}[1]{\gdef\@pdfkeywords{#1}}
\AtBeginDocument{
  \hypersetup{
    pdftitle = {\@pdftitle},
    pdfauthor = {\@pdfauthor},
    pdfkeywords = {\@pdfkeywords},
    pdfsubject = {\@pdfkeywords}
  }
```

```
}
\makeatother

\addto\extrasenglish{%
  \def\sectionautorefname{Section}%
  \def\subsectionautorefname{Subsection}%
  \def\chapterautorefname{Chapter}%
  \def\algorithmautorefname{Algorithm}%
  \def\subfigureautorefname{\figureautorefname}
}
```

The hyperref-package loads the url package for typesetting. We allow breaking URLs at hyphens, since many DOIs require that to fit on a line.

For hypersetup to work properly, the author and title command have to occur *before* the begin of document. With a few exceptions, it is recommended to load `hyperref` last.

For the beamer class, we need the `bookmark` package to be able to manually add `section*` to the pdf-bookmarks. The capabilities of `hyperref` to do so are turned of by the beamer class.

The optional argument loads the necessary drivers for the different formats. Automatically loads the package `url` for which we define the additional commands `\email` and `\directory`. Breaking links in references works fine via pdflatex, but via dvips and ps2pdf the line breaking fails. The package `breakurl` fixes that, but we don't require that fix any more.

Remark: Should be loaded as late as possible since its job is to redefine many LaTeX commands. There used to be issues with the `showkeys` package which required the option `implicit=false`, but thereby messing up `\autoref`. These issues seem to be fixed since v6.76g. The remaining issue is an `ERROR: Argument of \hyper@anchorstart has an extra }` in the .bbl when compiling in draft mode (where all hypertext options should be turned off anyways). We circumvent that by explicitly setting the option `final`. Note: that this is surprising, because the natbib package that we use is recommended for use with hyperref. Further options:

`draft`	all hypertext options turned off
`final` (default)	all hypertext options turned on
`a4paper` (default)	paper size 210 mm x 297 mm

You may also define the colors for links and explicitely the pdf document information.

The pdf-information is taken from the `\title` and `\author` arguments. This works fine for the former, while for the latter, we often have to be more explicit with `\pdfauthor`. You are free to insert (comma separated) pdfkeywords with `\pdfkeywords` – in the future. For simplicity, we write the same information to pdfsubject (Yes, keywords and subject are not the same, but opinions on the difference differ, so we just treat pdfkeywords, pdfsubject, and keywords-environment) the same. Ideally (TODO) it should then be sufficient to specify it once (say as new command keywords which then maps to the three above).

We tried to have them before `\begin{document}` and then process them with `\AtBeginDocument` for automatic `pdftitle` and `pdfauthor`. It turns out that

1. it also worked when positioned otherwise and (more importantly) 2. almost always required explicit overwriting since `\author` also contains the address and `\title` may contain special symbols. So, we forget about the `\AtBeginDocument` workaround and define `pdftitle` and `pdfauthor` explicitely.

The README of the `hyperref` package mentioned bad support for the `equation` environment and suggesting to replace it globally by `gather` from the `amsmath` package. In other words, sometimes the vertical spacing around `equation` environments is broken; allegedly `microtype` sometimes restores that. Anyways global substitution by `gather` is *not* recommended, because `equation` has the feature that really short equations can interlace better with really short sentences before them. So, we'll stick to this (also semantically) nicer markup.

`\href` `\url` `\nolinkurl` `\autoref`

The following additional user macros are defined: - syntax: `\href{URL}{text}`. -syntax: `\url{URL}` or `\nolinkurl{URL}` to typeset as URL without creating a hyperlink. syntax: `\autoref{label}` places a contextual label in front of the reference. Remark: `\autoref` works via the counter name that the reference is based on. This fails, if e.g. a lemma and a theorem share the same counter.

This can be fixed by the package `aliascnt`. But we will fix it more easily with `thmtools`.

Alternative: `cleveref.sty` with the commands `\cref{<label>}` or `\cref{<label>, ...}` and equivalently `\Cref{<label>}`. This is more costumizable and has features to sort and handle several references in one instance. We keep a close watch on it.

4.5 Citations with natbib.sty

`natbib.sty`

```
\ifOptNatbib
\RequirePackage[round,longnamesfirst,sort,comma]{natbib}
\fi
```

The document begins with

```
\begin{document}
\bibliographystyle{plainnat}
```

though the style can be given anywhere in the document.

Possible citation styles (only listing author-year styles, no numerical ones):

- plainnat: square braces, commas
- agu (American Geophysical Union): square braces, semi-colon
- egu (European Geosciences Union): round braces, semi-colon
- agms, deu, kluver (Harvard set): round braces, none

Further package options:

- round: brackets delimit citations (default); alternatives: square, curly, angle
- longnamesfirst: first citation will use starred variant for full author list

- sort: multiple citations are sorted into the order in which they appear in the references section
- comma: multiple citations are separated by comma instead of colon (default) or semicolon

Further options: The list of references usually appears as `\section*` or `\chapter*`, depending on the class. If you want to change that, you redefine `\bibsection`. Redefine `\bibpreamble` if you want to specify a text that is inserted after `\bibsection` and before the actual list.

The document ends with

```
\bibliography{mybib} % corresponding to mybyb.bib
\end{document}
```

citep
citet

Now, two new commands are available

- `\citep{jon90}` for *parenthetical* citations as (Jones et al., 1990).
- `\citet{jon90}` for *textual* citations as Jones et al. (1990).

CAVE: Avoid LaTeX's standard `\cite` now, since it behaves like `\citet` for auhor-year, but like `\citep` for numerical citations – and a little wild anyways.

Further commands (in author-year mode) are

- `\citet[chap.~2]{jon90}`: Jones et al. (1990, chap. 2)
- `\citet[see][]{jon90}`: see Jones et al. (1990)
- `\citet*{jon90}`: Jones, Baker, and Williams (1990)
- `\citet{jon90, jon91}`: Jones et al. (1990, 1991)
- `\citealt = \citet` without parentheses
- `\citeauthor`: Jones et al.
- `\citeyear`: 1990
- `\citeyearpar`: (1990)
- `\citefullauthor = \citeauthor*`: Jones, Baker, and Williams

and of course just the same with `\citep`, when applicable.

Use `\Citet` and `\Citeauthor` if you want to enforce Upper Case Names, e.g. Von zur Gathen at the beginning of a sentence.

If you want to change the name of the references, the usual `\renewcommand*{\bibname}{}` or `\renewcommand*{\refname}{}` will not work. Instead we can use the more powerful `\renewcommand*{\bibsection}{\section*{A Complete List of Publications since 2003}}`.

4.6 Macros and Symbols

CAVE: l2tabu advises to use `\newcommand{<name>}{...}` instead of `\def\<name>{...}`, since this yields errors if the command is already defined. Furthermore, if your new command does will not have to absorb more than one paragraph (via `\par` or blank line) as argument (or none at all), then it is advisable to use `\newcommand*` instead; this helps testing for missing `}`. Some for `\newenvironment*`.

4.6.1 Delimiters

abs, norm, floor, bbracket

Defined using `\DeclarePairedDelimiter` provided by `mathtools`.

```
\DeclarePairedDelimiter{\abs}{\lvert}{\rvert}
\DeclarePairedDelimiter{\norm}{\lVert}{\rVert}
\DeclarePairedDelimiter{\floor}{\lfloor}{\rfloor}
\DeclarePairedDelimiter{\ceil}{\lceil}{\rceil}
\RequirePackage{stmaryrd}
\newcommand*{\bbracket}[1]{\left\llbracket #1 \right\rrbracket}
```

to denote $|x|$, $\lfloor x \rfloor$ and $[\![x]\!]$ with `\abs{x}`, `\floor{x}` and `\bbracket{x}`. The last package also enables $\leftarrow\!\shortmid$ by `\mapsfrom`.

how to load the package itself for use within the documentation

Also very useful for sets, scalar products – langle, rangle in general –, and bra-ket-vectors is the package

```
\RequirePackage{braket}
% \end{macrocode}
% The following commands produce inline versions |\bra{}|, |\ket{}|,
% |\braket{}|, |\set{}| and their uppercase counterparts expand with
% the equivalent of |\left| and |\right|.  Finally, it is OK to use
% \verb=|= within sets and scalar products.
%
% \subsubsection{physical units}
%
% \DescribeMacro{siunitx} Avoid formatting units by hand, better use
% |$\SI{9,81}{\kilo\gramm\metre / \square\second}$| or |$9.81~\si{\giga\byte}$|
%    \begin{macrocode}
\RequirePackage[binary-units=true]{siunitx}
```

Remark: This is the predecessor to the `SIunits`-package. It also provides `\ang{90}` for the frequently used degree in mathmode and can respects german localization as we instruct it through a `babel`-hook.

What about typesetting times and dates

At least for the former, there is always the possiblity of `12\textsuperscript{00}` in text mode.

4.6.2 AMS symbols

```
\RequirePackage{amssymb, amsfonts, amsxtra}
```

(Re)defines symbols; Most notably LaTeX's `\Box` is superseded by `\square`. Furthermore, `amssymb` loads `amsfonts`. For over 2000 more symbols, load the `stix`-package, available since TeX Live 2014.

`NN, ZZ, QQ, RR, CC, FF` **Sets** Is DeclareMathOperator here correct? Wouldn't newcommand be more appropriate? It is not only more appropriate. It is also the only way to produce for example the correct font for `\Fq` and place the `^{\times}` correctly.

```
\newcommand*{\BB}{\mathbb{B}}
\newcommand*{\CC}{\mathbb{C}}
\newcommand*{\FF}{\mathbb{F}}
\newcommand*{\Fp}{\mathbb{F}_{p}}
\newcommand*{\Fpx}{\mathbb{F}_{p}^{\times}}
\newcommand*{\Fq}{\mathbb{F}_{q}}
\newcommand*{\Fqx}{\mathbb{F}_{q}^{\times}}
\newcommand*{\Fqbar}{\overline{\Fq}}
\newcommand*{\Fr}{\mathbb{F}_{r}}
\newcommand*{\Frx}{\mathbb{F}_{r}^{\times}}
\newcommand*{\MM}{\mathsf{M}}
\newcommand*{\NN}{\mathbb{N}}
\newcommand*{\PP}{\mathbb{P}}
\newcommand*{\QQ}{\mathbb{Q}}
\newcommand*{\RR}{\mathbb{R}}
\newcommand*{\ZZ}{\mathbb{Z}}
```

Already defined `\PP` as `\mathbb{P}` for the projective P, but unfortunately `\AA` defined as some Angstrom Å. We use $\mathsf{M}(d)$ to denote the number of ring operations that are sufficient to multiply two polynomials of degree at most d (over a ring R). We can take $\mathsf{M}(d) = O(d^2)$ using the "classical" method, $\mathsf{M}(d) = O(d \log d \operatorname{loglog} d)$ using **?**, and $\mathsf{M}(d) = O(d \log d 8^{\log^* d})$ according to HarveyHoevenLecerf2014. CAVE: Do not confuse this with the popular notation of $MM(d)$ to denote the number of ring operations to multiply two square *matrices* of size $d \times d$. For that, we prefer the notation $O(d^\omega)$ with ω the exponent of square matrix multiplication (over the ring R). Here, we have classically $\omega \leq 3$, by Strassen $\omega \leq \log_2 7$, and by LeGall2014 $\omega < 2.3728639$.

`im, codim` **Operators** functions on sets or functions

```
\DeclareMathOperator{\im}{im}
\DeclareMathOperator{\codim}{codim}
\DeclareMathOperator{\id}{id}
```

`Gal` **Functors** in the categorical sense, i.e. work on objects and sets. Note that we can not use `\char` for the characteristic, since that is used for an important internal command; for probabilities we prefer set notation, as employed in the crypto book

```
\DeclareMathOperator{\Gal}{Gal}
```

```
\newcommand*{\prob}[2][]{\operatorname{prob}_{#1} \{ #2 \}}
\newcommand*{\jacobi}[2]{\left( \frac{#1}{#2} \right)}
\DeclareMathOperator{\chara}{char}
\newcommand*{\bigOh}[1]{O(#1)}
\newcommand*{\smalloh}[1]{o(#1)}
\newcommand*{\softOh}[1]{O\sptilde(#1)}
```

the latter requires `amsxtra` and we prefer it to $\widetilde{O}$ because accents on capital letters frequently mess up vertical spacing.

`dcup` **operators** disjoint union

```
\newcommand*{\dcup}{\mathbin{\dot{\cup}}}
\newcommand*{\rgets}{\stackrel{\$}{\gets}}
\newcommand*{\iso}{\cong}
```

`lcm, dlog, gen, enc, dec, ver, sig` **Functions** some frequently used functions (while `\gcd` is already defined, `\lcm` is not), mainly from cryptography

```
\DeclareMathOperator{\ord}{ord}
\DeclareMathOperator{\mult}{mult}
\DeclareMathOperator{\lc}{lc}
\DeclareMathOperator{\lcm}{lcm}
\DeclareMathOperator{\loglog}{loglog}
\DeclareMathOperator{\dlog}{dlog}
\DeclareMathOperator{\gen}{keygen}
\DeclareMathOperator{\enc}{enc}
\DeclareMathOperator{\dec}{dec}
\DeclareMathOperator{\ver}{ver}
\DeclareMathOperator{\sig}{sig}
\DeclareMathOperator{\adv}{adv}
```

People famous parties in crypto-games; the command `\xspace` provided by the package of the same name adds a space unless certain punctuation follows the command

```
\RequirePackage{xspace}
\newcommand*{\TA}{\textsc{Trusted Authority}\xspace}
\newcommand*{\Alice}{\textsc{Alice}\xspace}
\newcommand*{\Bob}{\textsc{Bob}\xspace}
\newcommand*{\Charlie}{\textsc{Charlie}\xspace}
\newcommand*{\Eve}{\textsc{Eve}\xspace}
```

5 Algorithms and Code

```
\RequirePackage[final]{listings}
\lstset{breaklines=true}
```

Listings Put program code in a `lstlisting`-environment. The option `breaklines=true` makes smart line breaks, e.g. for SAGE-output, so we do not have to care about that. The package option `final` overwrites a global `draft` option which would produce only captions and corresponding labels.

load the autoref package, customize it, and define the environment algorithm2f which suits your needs better. autoref uses algorithmautorefname. No need to (re)define algorithm2eautorefname. The option `algo2e` is employed for better compatibility when translating to classes which predefine an `algorithm`-environment. The option `vlined` ends loops with a small vertical line instead of the keyword `END`. We prefer that for space and clarity. The two-column version of `sig-alternate` messes up `algomargin` such that two digit line numbers intersect with the border. We fix that.

```
\ifOptBeamer\else
\RequirePackage[linesnumbered,vlined,ruled,algo2e,algosection]{algorithm2e}
\SetKwInput{Input}{Input}    % use as \Input{bar} and \Output{foo}
\SetKwInput{Output}{Output}  % ... and finish with \Return foo\;
\SetKw{To}{to}    % we want lowercase for this keyword
\SetKw{break}{break}    % should also be a keyword
\DontPrintSemicolon
\renewcommand*{\AlgoLineautorefname}{step}
\ifOptSigAlterFix
\setlength{\algomargin}{2em}
\fi

\RequirePackage{etoolbox}
\AtBeginEnvironment{algorithm2e}{
\stepcounter{equation}
}
\SetAlgoRefName{\theequation}

\newenvironment*{algorithm2f}{
\begin{algorithm2e}
}{
\end{algorithm2e}
}

\newenvironment*{problem2e}[1][htbp]{
\begin{algorithm2e}[#1]
\addtocounter{equation}{1}
\SetAlgoRefName{\theequation}
\SetAlgorithmName{Problem}{Problem}{Problem}
}{
\end{algorithm2e}
}
\fi

```

The last line fixes the header of todonotes' Todo list, after natbib breaks it;

algorithm2e does not like that fix so it has to occur here.

6 Floats: graphics, tables, algorithms

Remark: If you want to center the content of floating objects like figures and tables, use `\centering` instead of the `center`-environment, since the latter introduces vertical space, which is unintended in most cases.

6.1 Tables: tabular (default: text) and array (default: math)

`array.sty` extended implementation of the LaTeX `array`- and `tabular`-environments. The standard definitions `l`,`c`,`r`,`p{width}` and `@{decl}` remain unchanged. Additionally you can now

`>decl` before any column definition to insert `decl` directly in front of the entry of the column

`<decl` same, but right after the entry

e.g. `\begin{tabular}{>{\bfseries} l l l}` will type the first column in bold. Of course, our main interest is in mathematics, so we define three new column types which immediately load math mode. Remark: If you use them in an `array`-environment, you get a column in LR mode, because the additional $'s cancel the existing ones.

```
\RequirePackage{array}
\setlength{\extrarowheight}{1pt}
\newcolumntype{L}{>{$} l <{$}}
\newcolumntype{C}{>{$} c <{$}}
\newcolumntype{R}{>{$} r <{$}}
```

Remark: The extra row height avoids horizontal lines touching the capital letters.

`booktabs.sty` provides `\toprule`, `\midrule`, and `\bottomrule`. These have better spacing than `\hrule` and tables should have no other horizontal lines and absolutely no vertical lines.

```
\RequirePackage{booktabs}
```

6.2 listings and algorithm2f

7 Updating, Fine-Tuning and Bugfixing

`comment.sty` From time to time you may want to exclude certain parts, e.g. all proofs. The `comment`-package gives a convenient way to do so via `\excludecomment{proof}`.

```
\RequirePackage{comment}
\def\CommentCutFile{\jobname.comment}
```

You may then define further environments (see `solution` and `exammod` in `exercise-header.sty`). Two important restriction on the syntax – whose violation leads to hard-to-debug-errors – are: The `\begin{comment}` and `\end{comment}`

should appear on lines of their own. And there should be no starting spaces and nothing after it.

Alternative/CAVE: `verbatim.sty` also defines a `comment`-environment. But, this package's main purpose are reimplementations of the `verbatim`- and `verbatim*`-environments with better memory handling and the command `\verbatiminput{<file>}`. It is required by `sagetex.sty` (for listings), but interacts badly with `ltxdoc.cls` (probably since the latter also redefines `verbatim`-related commands via `doc.sty`). Anyways, proofs would be excluded via

```
\let\proof=\comment
\let\endproof=\endcomment
```

When trying both, we loaded `verbatim.sty` before

`microtype.sty` highly recommend when using pdfLaTeX (plain LaTeX can not make use of it), because it improves line filling with:

font expansion it horizontally expands the characters in order to optimally fill each line;

character protrusion it lets some characters protrude into the margins (typically the hyphens and punctuation signs).

```
\RequirePackage{microtype}
```

Load *after* all fonts have been loaded; microtype needs to know that. May significantly increase compile time – no evidence for that so far.

`fixmath.sty` LaTeX does not italicize uppercase Greek letters (e.g. in mathmode); this conflicts with their usage as variables. To fix this with CM math fonts, we use `fixmath`.

```
\RequirePackage{fixmath}
```

Warning: This will most likely fail with other fonts (like Palatino via `mathpazo`). If you ever use them, test this and if necessary consider the much heavier package `isomath`.

Thanks to Mark Giesbrecht for implicitely pointing me to this with his `\DeclareMathAlphabet{\mathbold}{OML}{cmm}{b}{it}` in our first joint paper.

8 Typesetting Text

8.1 More enumerate-like environments and the option resume

`alnumerate,ronumerate`

```
\ifOptBeamer\else
\RequirePackage{enumitem}
\newlist{alnumerate}{enumerate}{1}
\setlist[alnumerate,1]{label=(\alph*)}
\newlist{ronumerate}{enumerate}{1}
\setlist[ronumerate,1]{label=(\roman*)}
\fi
```

We define two new enumerate-like environments which count and reference like (a) (for exercises) and (i) (for theorem statements). Both are only defined for a single level, so no nesting is intended. The default `enumerate` environment can nest up to 4 levels and numbers as 1. (a) i. A.; in other words: `\arabic*. (\alph*) \roman*. \Alph*`. We use it for process descriptions.

You can resume the counter from a previous list with the option `[resume]`.

A Check, Convert, and Submit

A.1 Before Submission

1. Check against checklist in `write_a_paper.org` and have somebody else read it.
2. Match against skeleton in Figure A.1. In particular, specify keywords and ACM class.
3. Check with `$ pdfinfo <short_title>.pdf` for title, author.
4. Check that tables, figures, and algorithms are referenced and that their captions are self-explanatory. (We check the placement later.)
5. Spellcheck the body with `M-x ispell-region`. (`i` to insert, `SPC` to skip, , `a` to accept for session)
6. Check grammar with `https://www.languagetool.org/` or `http://nitpickertool.com/live.html`
7. Check log-file for nag's warnings, multiply-defined labels, etc. (but not overfull/underfull boxes yet)
8. `$ chktex foo.tex` with `ChkTeX` by Jens Berger (shipping with TeX Live as version 1.7.1; alternative version (1.6.4) by Baruch Even available from `http://baruch.ev-en.org/proj/chktex/` dates from 2007);
9. to test: `$ lacheck foo.tex` also shipping with TeX Live
10. Copy `<short_title>.tex` to subfolder and rename according to `research/README`; `$ git tag` the original in top-folder.
11. make folder `YYYY-MM-DD--v<num>` in `submitted_to/arxiv`
12. copy therein <file>.tex, <file>-pics.pdf, and artmacs.sty
13. generate <file>.bbl
14. if sagetex was involved, copy therein sagetex.sty, .sagetex.sout, and folder sage-plots-for-<file>.tex
15. adjust path of `load('*.sage')`

A.2 After conversion

1. Convert `documentclass` as described below.
2. if the bbl gives you trouble, then copy it (see below) and edit manueally

```
\documentclass[
12pt,
a4paper,
draft,
% final,      % disable todos and write *no* .sagetex.sage
]{article}

\usepackage{artmacs}    % should be the first to load

% local commands and definitions

\begin{document}

\title{}        % article.cls allows title/author in the header,
                % we keep it close to the other meta-information
\pdftitle{}     % no special characters
\author{}       % with address, \email, \url, \and-separated
\pdfauthor{}    % comma-separated

\maketitle
\tableofcontents

\begin{abstract}

\end{abstract}

\begin{keywords} \end{keywords}
\pdfkeywords{}
\begin{AMS} \end{AMS}


Lorem ipsum ...


\bibliographystyle{cc2e}    % our extension of cc2
\bibliography{journals,references,refs,lncs}

\listoftodos

\end{document}
```

Figure A.1: Skeleton for an article with artmacs. fig:article

3. If you use `\qedhere` from the `amsthm`-package, check that the proof environment of the new documentclass respects that, i.e. does not duplicate the tombstone; if it does, you probably have to undefine `\qedhere` by `\(re)newcommand*{\qedhere}{}`

4. Check that optional arguments (citations) in theorem titles do not contain additional brackets

5. If you want to exclude proofs search-and-replace `{proof}` by `{comment}` (CAVE: nesting comments fails) or even easier try `\excludecomment{proof}` in the header (CAVE: works with `article.cls`, but fails with `sig-alternate.cls`).

6.

7. Check the placement of figures, tables, and algorithms, usually you want `[h!]`.If tables are too large, try `\small` and `\footnotesize` after `\begin{table}`.

8. IF NOT CAMERAREADY and you exceed the page limit, try the tips below

9. IF CAMERAREADY, check for and overfull/underfull boxes, widows, orphans, and bad hyphenation; fix with `\pagebreak[1-4]` or `\quad`'s if equation numbers run into formulas. Remember that (automatic) breaking of inline math is different from (manual) breaking in display math. For the latter, we *begin* the new line with =, +, etc. For the former, we *end* the old line with =, +, etc. LaTeX does this automatically for *outer* (i.e. not enclosed in groups or parenthesis) operators.

10. IF CAMERAREADY, enable the italics correction – due to mathtools – in theorem-like environments by replacing all `$f$` with `\(f\)`. In emacs a regexp-search-replace of `\$` with `\,(if (evenp \#) "\\\(" "\\\)")` does the job.

11. Carefully read your document – again.

To make stuff fit for a submission (not for the camera-ready version), try `savetrees.sty`. You can get a quick feel with the options `subtle` (default), `moderate`, `extreme`. There is no option to disable the package, but `all=normal` disables all individual features and you can turn them back on individually with `paragraphs=tight` for fine-tuning (see the documentation for all features).

Other hints at `http://thomas.deselaers.de/computing/texsqueezing.html` or `http://www.eng.cam.ac.uk/help/tpl/textprocessing/squeeze.html`.

A.3 Shipping the sources

`item:1`

1. add `\pdfoutput=1` to the first line of <file>.tex

2. minimal cleanup: remove emacs backup file `<file>.tex~`, since it will be automatically renamed after unpacking and processed as additional tex-file thereby *doubling* the output.

3. `tar -zcf <file>.tar.gz *` or `zip <file>.zip -r *` and upload (no need, to clean up here, since the arxiv is very forgiving, see next point)

4. Remove everything after the first `\end{document}` and all comments. The arXiv's FAQ suggest the following perl-command:

```
$ perl -pe 's/(^|[^\\])%.*/$1%/' < old.tex > new.tex
```

5. Replace `\bibliography{journals,references,refs,lncs}` with the content of `<file>.bbl`

6. include `artmacs.sty` and other nonstandard packages (`sagetex.sty`) as `filecontents`, see below.

7. test on vanilla TeX Live

document used version of packages with something like listfiles-command

Load `\usepackage{filecontents}` after `\usepackage{artmacs}`. The `filecontents`-package adds two nice features: overwriting of existing files (very useful, when "editing" the `.bbl`) and placing `filecontents` anywhere before `\end{document}` (without this package, the restriction is "before `\begin{document}`"). Our choice: right before `\end{document}` – naturally close to `\bibliography` and far away from all top-down searches we will perform.

The `filecontents*`-environment omits some "origin-information in the written file; this information does not harm us (it is meant for writing `.eps`-files) and might come handy sometime. So, our choice:

```
\begin{filecontents}{\jobname.bbl}
<copy .bbl herein>
\end{filecontents}
```

If BibTeX complains about `Missing newblock`, insert `\def\newblock{\hskip .11em plus .33em minus` right after the document class.

There seems to be an untested fancier solution with the programs `arlatex` and `bundletex`, see `ftp://ftp.fu-berlin.de/tex/CTAN/support/bundledoc/arlatex.pdf`.

A.4 submit to arXiv

Do the checklist and read the hints.

Submission deadline is Monday through Friday at 16:00 EST; visibility starts at 20:00 EST of the same day (where the weekend Friday–Sunday is a "single day", so that friday submissions before 16:00 appear on sunday evening and friday submission after 16:00 appear on monday evening).

This is quick and easy (<1 hour), since the arxiv has a complete TeX Live system, can process with pdfLaTeX, and respects subdirectories (when uploading .tar.gz).

1. check before submission as above

item:3

2. ship sources as tar, see above
3. arxiv processes after decompressing:
   - discards unnecessary auxiliary files (basically all of type "unknown")
   - discards output files (like <file>.pdf)
   - CHECK that type of <file>.tex is *PDF*LaTeX – if not, you probably missed step 1 above.
4. Check the output – if there are twice as many pages, restart from step 2.
5. if yet to appear, then add comment "to appear in <journal>" (starts with lowercase; terminates without full stop) – CAVE: this can only be changed by generating a new version
6. if already appeared, then add journal (<journal> <vol> (<year>) <pages>) and DOI (<num>.<num>/<whatever>) – NOTE: this can be updated without generating a new version
7. For MSC-class and ACM-class see Subsection 3.5

A.5 submit to PDF eXpress for IEEE

The IEEE sometimes uses PDF eXpress to validate the pdf for the camera-ready version. This requires a version without bookmarks. We obtain this via

```
$ pdftk A=latex-output.pdf cat A1-end output nobookmarks.pdf
```

A.6 convert to IEEEtran.cls for DEW

This class wants captions *before* tables, but *after* figures. Adjust accordingly.

A.7 convert to acmart.cls for "TARK"

A.8 convert to llncs.cls for "Weworc" and "Financial Cryptography and Data Security"

llncs.cls

Before reading on: do the checklist!

Availability Download from `ftp://ftp.springer.de/pub/tex/latex/llncs/latex2e/llncs2e.zip`; stored latest version (27 Sep 2013, v2.18) in `~/texmf/tex/latex/llncs2e`

Documentation Included in zip (above) as `llncs.dvi` and `llncsdoc.pdf`; stored the latter in `~/texmf/doc`

Author Guidelines in addition to the class-documentation, there are/may be "Author Guidelines", e.g. for the Springer Computer Science Proceedings; stored latest version (28 Nov 2013) in `~/texmf/tex/latex/llncs2e`

checked for updates on 24/Jan/2014

A.8.1 Step 1: switch class and compile

- change `\documentclass[...]{article}` to `\documentclass[envcountsame,oribibl,runninghead`
  The option `oribibl` allows us to use our own favorite citation-style `cc2e`.
- add option `llncs` to `\usepackag{artmacs}`.
- split address from `\author` and put it into `\institute` (in the easiest case, this requires, one command and a pair of braces – otherwise connections with `\inst{1}`).

A.8.2 Step 2: fix layout

1. All words in titles should be capitalized except for conjunctions, prepositions (e.g. on, of, by, and, or, but, from, with, without, under) and definite and indefinite articles (the, a, an) unless they appear at the beginning.
2. the abstract should contain at least 70 and at most 150 words
3. keywords should be separated `\textperiodcentered{}` instead of commas (no special keyword environment?!)
4. Section headings should be capitalized (except articles, prepositions, and conjunctions); for hyphenated words a special rule applies: If the first word can stand alone, the second should be capitalized. Examples: Criteria to Disprove Context-Freeness of Collage Language, On correcting the Intrusion of Tracing Non-deterministic Programs by Software, A User-Friendly and Extendable Data Distribution System, Multi-flip Networks: Parallelizing GenSAT, Self-determinations of Man.
5. Change `\section{Acknowledgements}` to `\subsubsection{...}`.

`llncs.cls` works with chapters and this makes natbib use chapters for the bibliography. It should use sections and we use the following fix from `http://www.togaware.com/linux/survivor/Bibliography_Starts.html`

```
\ifOptLlncs
\makeatletter
\renewcommand\bibsection%
{
  \section*{\refname
    \@mkboth{\MakeUppercase{\refname}}{\MakeUppercase{\refname}}}
}
\makeatother
\fi
```

A.8.3 Step 3: add meta-information

- Check abstract.
- Provide key words.

A.8.4 Page numbers and todos for proofreading

The llncs class sets `\setcounter{tocdepth}{0}` so the todo items, which are declared as level 1 (section) don't appear. Furthermore, we want also subsections to show up in the tableofcontents, so we go for `\setcounter{tocdepth}{2}`. Finally, author and title would show up in the toc – since that is really intended for the toc of the whole book. We don't want that for our local toc – which has to go for the final submission, anyways!

omit modifications to TOC, when calling artmacs with options llncs, final

```
\ifOptLlncs
\setcounter{tocdepth}{2}

\makeatletter
\renewcommand*\l@author[2]{}
\renewcommand*\l@title[2]{}
\newcommand*{\authcount}[1]{}
\renewcommand*{\tableofcontents}{
\makeatletter
\@starttoc{toc}
\makeatother
}
\makeatother
\fi
```

A.9 convert to sig-alternate.cls for ISSAC

`sig-alternate.cls`

Before reading on: do the checklist!

Availability Download from `http://www.acm.org/sigs/publications/sig-alternate.cls`; stored latest version (23 May 2012) in `~/texmf/tex/latex/sig-alternate`; checked for updates on 24/Jan/2014

Documentation Available at `http://www.acm.org/sigs/publications/sig-alternate-v1.1` (no pdf!); stored (cleaned up) version in `~/texmf/doc`

Conflicts:

- `sig-alternate.cls` defines a `proof`-environment, but no other `theorem`-like environment. We would like to use the `proof`-environment of `amsthm.sty` and therefore disable the `proof`-definition of `sig-alternate.cls`
- `keywords` is a *command* for `sig-alternate.cls`, not an *environment* as for `artmacs`; we disable the latter

- `algorithm2e` and `pst-add` are compatible in `article`, but not in `sig-alternate`. Load only the necessary Postscript-packages instead of `pst-full`.

A.9.1 Step 1: switch class and compile

time effort: less than 10 minutes.

- change `\documentclass[...]{article}` to `\documentclass[...]{sig-alternate}` and remove options `a4paper` and `12pt`.
- add option `sig-alternate` to `\usepackage{artmacs}`.
- no marginpar's are allowed, so while you have todos make them inline with `\presetkeys{todonotes}{inline}{}`
- remove `\tableofcontents`; (we used to have fixes to show it, but it distorts the page layout and you can get all the information from the pdf's table of contents – and check that information while you're at it)
- If you turned an `algorithm2e`-environment into non-floating with the option `[H]` you have to remove that option.

A.9.2 Step 2: fix layout

- Make formulaes in the title `{\huge $\mathbf p^{2} $}`.
- If figures and tables should span both columns change to `figure*`- and `table*`-environments, respectively.
- Get lowercase letters in section headings with the patch `lcsect.sty` (not in TeX Live, now in `tex/latex/misc`) and the command `\lcsection{TITLE WITH LOWERCASE MATH $k`
- Fix long optional arguments `[]` of environments by turning them into `()`.
- For overfull hboxes see checklist at the beginning.

A.9.3 Step 3: add meta-information

time effort: ???

1. CAMERAREADY ONLY Provide `\numberofauthors` and format `\authors` according to `https://www.acm.org/sigs/publications/sig-alternate-v1.1`.
2. CAMERAREADY ONLY Add a `\category` according to ACM 1998 Computing Classification System at `https://www.acm.org/about/class/1998`. For example,

```
\category{F.2.1}{Analysis of Algorithms and Problem
Complexity}{Numerical Algorithms and Problems}[Computations on polynomials\vspace*{-9pt}]
```

You may have several instances of this command in a single document.

3. CAMERAREADY ONLY Add one or more of the 16 general terms specified in section 2.3.3 of the documentation, e.g.

```
\terms{\vspace*{-3pt}Theory\vspace*{-8pt}}
```

   The command also takes a list as argument.

4. Turn the `keywords`-environment into the `\keywords`-command. The format is a comma-separated list in alphabetical order, capitalizing only the first letter of the first word. For example,

```
\begin{keywords}
  Combinatorics on polynomials, computer algebra, counting special
  polynomials, finite fields, Ritt's second theorem, tame polynomial decomposition
\end{keywords}
```

5. CAMERAREADY ONLY Add conference info (ISSAC disclaimer).

A.9.4 Page numbers for proofreading

`\pagestyle{plain}` is *not* enough to get page numbers, but `\pagenumbering{arabic}` is. (And it's exactly what we want.)

make this follow from draft-option

A.10 convert to siamltex.cls for SIAM

`siamltex.cls`

Do the checklist and read the hints.
time effort: less than 10 minutes.

- change `\documentclass[...]{article}` to `\documentclass[draft,final]{siamltex}`.
- copy artmacs.sty into a `\begin{filecontents}{\jobname--additional_macros.sty} ... \end{f` environment, insert it after `\usepackage{filecontents}` and `\documentclass`
- remove `amsthm` from the copy of artmacs.
- to make also the predefined environments `theorem`, `lemma`, `corollary`, `definition`, and `proposition` share the equation counter, substitute `\declaretheorem[sibling=equation]{theorem}` by `\newtheorem{thm-alt}[equation]{Theorem` and search-replace all occurrences of `{theorem}` by `{thm-alt}`. Some for the other environments (if present).

- To fix the proof environments, check when an `\end{proof}` comes after an equation or an enumerate. In that case, substitute by `\qquad \endproof` or `\endproof`, respectively, immediately in the last line and change `\begin{proof}` to `{\em Proof}. .`
- substitute `\usepackage{artmacs}` by the following lines to load the local copy, disable the invalid commands `\qedhere` and `\tableofcontents`, and give the tables and figures a common counter.

```
\usepackage{\jobname--additional_macros.sty}
\newcommand*{\qedhere}{}
\renewcommand*{\tableofcontents}{}
\makeatletter
\let\c@figure\c@table
\makeatother
```

- Change `title`, `author`, `footnotetext` as by the manual.
- Satisfy environments `abstract`, `keywords`, and `AMS` as by the manual.
- Make running header with short title as by the manual.
- Add `\footnotesize` after each `\begin{table}`. Make sure `\centering` follows.
- BibTeX repeatedly such that crossrefs in references are present.
- copy folder for sage-plots and file.sagetex.sout
- Check that artmacs is loaded first after `\documentclass`.

A.11 convert to elsarticle.cls for JSC

Do the checklist and read the hints.

time effort: less than 5 minutes.

Download the most recent `elsarticle.cls` and `elsarticle-harv.bst` from Elsevier, because TeXLive's versions are out-of-date (v1.20 from 2008/10/13 compared to v2.0 from 2012/08/15; last checked 2015/09/30). Do *not* use the outdated `elsart.cls`, although provided on the JSC-webpage. They also accept the more recent and more compatible `elsarticle.cls`.

- change documentclass to `elsarticle` (default options are: a4paper, 10pt, oneside, onecolumn, preprint – so remove all "your" options except `draft`, `final`.)
- add `\biboptions{authoryear,round,longnamesfirst,sort,comma}` immediately thereafter and pass option `elsarticle` to package `artmacs`;

check

whether there is a possibility to just have `\biboptions{authoryear}` at the beginning and "get" all the other options from the artmacs-package – then `authoryear` could also be passed as option to the `documentclass` (saving one line and improving consistency).

- Change `\bibliographystyle` to `elsarticle-harv`
- Split author field into `\author[1]{FirstName1 LastName1\corref{cor}}`, `\author[2]{FirstName2 LastName2}`, etc. and add `\address[1]{University\\Town}` and `\address[2]{University\\Town}`, respectively. Add email-address `\ead{a@bc.de}` and homepage `\ead[url]{www.home.page}` after each author. Finally, indicate corresponding author like above and specify text `\cortext[cor]{Corresponding author}`.
- Change `keywords`-environment to `keyword`; change commas to `\sep`. Add line – within this environment – giving the MSC-classification `\MSC[2010] 11T06\sep 12Y05\sep 68W`
- Enclose `author`, `title`, `address`, `abstract`, `keyword` in `frontmatter`-environment and comment `\maketitle`.
- The .bbl needs some post-processing: remove `\newline`s and replace `and` by `\&`.

A.12 use with beamer.cls

Also here, we compile with `pdflatex`. Some old pstricks-pictures then require the package `auto-pst-pdf` and shell escape (C-c C-t C-x) and (no option `off` on the first run).

Paste content of current artmacs.sty comment hyperref, since loaded automatically add `\usepackage{etex}` (to extend the register, s.t. pstricks has enough room) and `\reserveinserts{25}` for more space (also sometimes 50, forgotten why), comment enumitem, since beamer has its own special itemize- and enumerate-environments; in particular they take the optional argument `[<+->]` to uncover `item` by `item` (avoiding several `\pause`s). If you want to uncover an item together with its successor, just add [<.->] to that item.

CAVE: pauses in the align-environment are a problem, see the beamer manual; a possible solution using `\uncover<+->` is suggested there which does *not* work with pdflatex, when using `\setbeamercovered{transparent}` as, for example, beamerthemecosec does. Whether any (or both) of the solutions (pause/uncover) work depends on the parameters latex/pdflatex, transparent/invisible. Anyways, for our "default" situation, described above with the following patch by Hendrik Vogt, both work (and we prefer `\pause`). (Without the patch, things already work if the covering is "invisible".)

Tikzpictures use the options `remember picture, overlay,` and then `shift={(6,-4.7)}, scale=0.6,` for easy placement.

(Eventually, this is supposed to become part of pgf?!)

beamer has its own theorem-style environments; conflicts with amsthm are outruled thanks to the beamer documentclass option `notheorem`, `noamsthm`; apart from

that put `\RequirePackage{thmtools}` and the subsequent `\declaretheorem`s in coments, also the new keyword environment is not liked; exclude the algorithm2e package, since we do this by hand anyways

Todonotes do not work within frames and yield strange results outside; suggested fixes employing `\presetkeys{todonotes}{inline}{}` work only partially, and anyways, we aren't even certain which result we'd like to have. So, use `\note{TODO <foo>}` instead.

A.13 use with exam.cls

To load without errors, it is sufficient to choose the `beamer`-option.

B For your consideration: optional commands

B.1 Signatures for Quotes

`\signed` To sign quotes (single paragraph) or quotations (several paragraphs), the command `\signed` puts the author emphasized in the lower right corner. On the last line if there is enough space, on a new line if it is not.

```
\newcommand*{\signed}[1]%
{\unskip\hspace*{1em plus 1fill}%
  \nolinebreak[3]\hspace*{\fill}\mbox{\emph{#1}}}
```

The code is taken from Hack # 6 of LaTeXHacks. Basically `\hspace*{\fill}\mbox{\emph{#1}}` already does the trick to typeset the author right-aligned. The `\nolinebreak[3]` is necessary to tell LaTeX that we do not want a linebreak unless necessary. This is almost it – besides the problem, that if there is a linebreak now, the old line gets stretched to fill the complete space, since the original `\parfillskip` was overruled. We replace it with `\hspace*{1em plus 1fill}`. Finally, we add `\unskip` to make `bla. \signed{author}` and `bla.\signed{author}` look the same.

B.2 Paragraph indentation and Line skip

`\parindent` Usage: `\setlength{\parindent}{1em}`

`\parskip` CAVE: l2tabu advises to use font-dependent lengths (1em) instead of absolute

`parskip.sty` lengths(1em). Using TeX-syntax `\parindent=1em` is discouraged.

B.3 Equation as item without empty line

If an item should only feature an equation – and textstyle is not an option, since it should get an equation number – then use Herbert Voss' itemMath as described in mathmode to adjust the spacing.

If you want to put an equation as an item, you either had to precede it with some fluff ("We have ...") or somehow center the `$foo$`. Here is a much cleaner solution by Herbert Voss.

\itemMath

```
\def\itemMath#1{%
\raisebox{-\abovedisplayshortskip}{%
\parbox{0.75\linewidth}{%
\begin{equation}#1\end{equation}}}}
```

Usage: `\item \itemMath{\label{eq:1} ...}`

C For your consideration: optional packages

C.1 geometry.sty

`geometry.sty` the recommendation to modify the page layout (paper size, margins).

CAVE: l2tabu advises you to keep your hands of `margin.sty` or `\oddsidemargin`, `\hoffset`, `\voffset`, etc.

C.2 setspace.sty

`setspace.sty` to change the line spacing.

CAVE: l2tabu warns about `\linespread{<factor>}` or `\renewcommand*{\baselinestretch}{<facto`
CAVE: l2tabu warns about `setspace.sty`

C.3 fancyhdr.sty

`fancyhdr.sty` l2tabu: `fancyhdr.sty` the recommendation to modify headers and footers; do not use `fancyheadings.sty`

C.4 wrapfig.sty

`wrapfig.sty` To make text wrap around figures the `wrapfig` package can be employed a typical syntax would be

```
\begin{wrapfigure}[height of figure in lines]{l,r,...}[overhang]{width}
  figure, caption, etc.
\end{wrapfigure}
```

where l(eft) or (r)ight may also be specified i(nside) or o(utside) for two-sided documents to specify the position on the page. The `overhang` moves the figure into the margin (but does *not* add to `width`).

Alternatively: I also the tried `floatflt` package, but got error messages even with a minimal example

add as (no)cites

`de-tex-faq`, `l2tabu`, `amsldoc`, `Anselm Lingnau, \LaTeX\ Hacks`.

Todo list