```
%%
%% This is file `compositionality.cls',
%% it provides the compositionalityarticle class for typesetting articles in
%% Compositionality - the open journal for the mathematics of composition
%%
%% Copyright 2018, 2019, 2020
%% https://compositionality-journal.org
%%
%% It is derived from `article.cls' available from
%% https://www.ctan.org/pkg/article
%%
%% It may be distributed and/or modified under the
%% conditions of the LaTeX Project Public License, either version 1.3c
%% of this license or (at your option) any later version.
%% The latest version of this license is in
%%    http://www.latex-project.org/lppl.txt
%% and version 1.3c or later is part of all distributions of LaTeX
%% version 2005/12/01 or later.
%%
\NeedsTeXFormat{LaTeX2e}[1995/12/01]
\def\compositionalityarticleversion{2.0}
\ProvidesClass{compositionalityarticle}
[2020/05/01 v\compositionalityarticleversion
class for Compositionality - the open journal for the mathematics of composition
(https://compositionality-journal.org)]
\RequirePackage{xkeyval}
\RequirePackage{etoolbox}
\RequirePackage{graphicx}
\DeclareGraphicsExtensions{.pdf,.jpeg,.png,.eps}
\newcommand*\@ptsize{}

\newtoggle{@restonecol}
\newtoggle{@titlepage}
\togglefalse{@titlepage}

\newtoggle{@papersizespecified}
\togglefalse{@papersizespecified}

\DeclareOptionX{a4paper}
{
        \setlength\paperheight{297mm}%
        \setlength\paperwidth{210mm}
        \toggletrue{@papersizespecified}
}
\DeclareOptionX{a5paper}
{
        \setlength\paperheight {210mm}%
        \setlength\paperwidth  {148mm}
        \toggletrue{@papersizespecified}
}
\DeclareOptionX{b5paper}
{
        \setlength\paperheight {250mm}%
        \setlength\paperwidth  {176mm}
        \toggletrue{@papersizespecified}
}
\DeclareOptionX{letterpaper}
{
        \setlength\paperheight {11in}%
        \setlength\paperwidth  {8.5in}
        \toggletrue{@papersizespecified}
}
\DeclareOptionX{legalpaper}
{
```

```
            \setlength\paperheight  {14in}%
            \setlength\paperwidth   {8.5in}
            \toggletrue{@papersizespecified}
    }
    \DeclareOptionX{executivepaper}
    {
            \setlength\paperheight  {10.5in}%
            \setlength\paperwidth   {7.25in}
            \toggletrue{@papersizespecified}
    }
    \DeclareOptionX{landscape}
    {
            \setlength\@tempdima    {\paperheight}%
            \setlength\paperheight  {\paperwidth}%
            \setlength\paperwidth   {\@tempdima}
    }

    \DeclareOptionX{10pt}{\renewcommand*\@ptsize{0}}
    \DeclareOptionX{11pt}{\renewcommand*\@ptsize{1}}
    \DeclareOptionX{12pt}{\renewcommand*\@ptsize{2}}

    \DeclareOptionX{oneside}{\boolfalse{@twoside}\boolfalse{@mparswitch}}
    \DeclareOptionX{twoside}{\booltrue{@twoside}\booltrue{@mparswitch}}

    \DeclareOptionX{draft}{\setlength\overfullrule{5pt}}
    \DeclareOptionX{final}{\setlength\overfullrule{0pt}}

    \DeclareOptionX{titlepage}{\toggletrue{@titlepage}}
    \DeclareOptionX{notitlepage}{\togglefalse{@titlepage}}

    \DeclareOptionX{onecolumn}{\boolfalse{@twocolumn}}
    \DeclareOptionX{twocolumn}{\booltrue{@twocolumn}}

    \DeclareOptionX{leqno}{\input{leqno.clo}}
    \DeclareOptionX{fleqn}{\input{fleqn.clo}}
    \DeclareOptionX{openbib}{%
            \AtEndOfPackage{%
                    \renewcommand\@openbib@code{%
                            \advance\leftmargin\bibindent
                            \itemindent -\bibindent
                            \listparindent \itemindent
                            \parsep \z@
                    }%
                    \renewcommand\newblock{\par}}%
    }

    %declare some dummy options for compatibility
    \DeclareOptionX{checkin}{}
    \DeclareOptionX{preprint}{}
    \DeclareOptionX{reprint}{}
    \DeclareOptionX{manuscript}{}
    \DeclareOptionX{noshowpacs}{}
    \DeclareOptionX{showpacs}{}
    \DeclareOptionX{showkeys}{}
    \DeclareOptionX{noshowkeys}{}
    \DeclareOptionX{balancelastpage}{}
    \DeclareOptionX{nobalancelastpage}{}
    \DeclareOptionX{nopreprintnumbers}{}
    \DeclareOptionX{preprintnumbers}{}
    \DeclareOptionX{hyperref}{}
    \DeclareOptionX{bibnotes}{}
    \DeclareOptionX{nobibnotes}{}
    \DeclareOptionX{footinbib}{}
    \DeclareOptionX{nofootinbib}{}
    \DeclareOptionX{altaffilletter}{}
```

```
\DeclareOptionX{altaffilsymbol}{}
\DeclareOptionX{superbib}{}
\DeclareOptionX{citeautoscript}{}
\DeclareOptionX{longbibliography}{}
\DeclareOptionX{nolongbibliography}{}
\DeclareOptionX{eprint}{}
\DeclareOptionX{noeprint}{}
\DeclareOptionX{author-year}{}
\DeclareOptionX{numerical}{}
\DeclareOptionX{galley}{}
\DeclareOptionX{raggedbottom}{}
\DeclareOptionX{tightenlines}{}
\DeclareOptionX{lengthcheck}{}
\DeclareOptionX{reprint}{}
\DeclareOptionX{eqsecnum}{}
\DeclareOptionX{secnumarabic}{}
\DeclareOptionX{floats}{}
\DeclareOptionX{stfloats}{}
\DeclareOptionX{endfloats}{}
\DeclareOptionX{endfloats*}{}
\DeclareOptionX{osa}{}
\DeclareOptionX{osameet}{}
\DeclareOptionX{opex}{}
\DeclareOptionX{tops}{}
\DeclareOptionX{josa}{}

\newtoggle{@amsfonts}
\togglefalse{@amsfonts}
\DeclareOptionX{amsfonts}{\toggletrue{@amsfonts}}
\DeclareOptionX{noamsfonts}{}

\newtoggle{@amssymb}
\togglefalse{@amssymb}
\DeclareOptionX{amssymb}{\toggletrue{@amssymb}}
\DeclareOptionX{amssymbol}{\toggletrue{@amssymb}}
\DeclareOptionX{noamssymb}{}

\newtoggle{@amsmath}
\togglefalse{@amsmath}
\DeclareOptionX{amsmath}{\toggletrue{@amsmath}}
\DeclareOptionX{noamsmath}{}

\DeclareOptionX{byrevtex}{}
\DeclareOptionX{floatfix}{}
\DeclareOptionX{nofloatfix}{}
\DeclareOptionX{ltxgridinfo}{}
\DeclareOptionX{outputdebug}{}
\DeclareOptionX{raggedfooter}{}
\DeclareOptionX{noraggedfooter}{}
\DeclareOptionX{frontmatterverbose}{}
\DeclareOptionX{linenumbers}{}
\DeclareOptionX{nomerge}{}
\DeclareOptionX{hypertext}{}
\DeclareOptionX{frontmatterverbose}{}
\DeclareOptionX{inactive}{}
\DeclareOptionX{groupedaddress}{}
\DeclareOptionX{unsortedaddress}{}
\DeclareOptionX{runinaddress}{}
\DeclareOptionX{superscriptaddress}{}

\newtoggle{@unpublished}
\togglefalse{@unpublished}
\DeclareOptionX{unpublished}{\toggletrue{@unpublished}}

\newtoggle{@accepted}
```

```
\togglefalse{@accepted}
\DeclareOptionX{accepted}[]{\ifstrempty{#1}{}{\def\@accepteddate{#1}}
\toggletrue{@accepted}\togglefalse{@unpublished}}

\newtoggle{@revtexcompatibility}
\togglefalse{@revtexcompatibility}
\DeclareOptionX{shorttitle}[]{\def\@shorttitle{#1}}
\DeclareOptionX{issue}[]{\def\@issue{#1}}
\DeclareOptionX{volume}[]{\def\@volume{#1}}
\DeclareOptionX{aps}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{pra}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{prb}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{pre}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{prl}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{prx}{\toggletrue{@revtexcompatibility}}
\DeclareOptionX{aip}{\toggletrue{@revtexcompatibility}}

\newtoggle{@allowfontchangeintitle}
\togglefalse{@allowfontchangeintitle}
\DeclareOptionX{allowfontchangeintitle}{\toggletrue{@allowfontchangeintitle}}

\newtoggle{@nopdfoutputerror}
\togglefalse{@nopdfoutputerror}
\DeclareOptionX{nopdfoutputerror}{\toggletrue{@nopdfoutputerror}}

%remind people not to use \today on the arxiv
\newtoggle{@allowtoday}
\togglefalse{@allowtoday}
\DeclareOptionX{allowtoday}{\toggletrue{@allowtoday}}

% set date to be empty as a default, otherwise latex will fill it with \@today which
triggers the allowtoday error
\date{}

\newtoggle{@noarxiv}
\togglefalse{@noarxiv}
\DeclareOptionX{noarxiv}
{
  \ExecuteOptionsX{a4paper,allowtoday,allowfontchangeintitle,nopdfoutputerror,unpublished}
  \toggletrue{@noarxiv}
}


\ExecuteOptionsX{10pt,oneside,twocolumn,notitlepage,final}
\ProcessOptionsX
% Throw an error if no paper size was manually specified
% Simply defaulting to a4paper gives inconsistent behaviour when submitting to the arXiv
as the arXiv seems to sometimes set a4paper and sometimes letterpaper, maybe depending on
the geographic region of the submitter?
\iftoggle{@papersizespecified}
{
}
{
        \setlength\paperheight {297mm}%
        \setlength\paperwidth  {210mm}%
        \iftoggle{@noarxiv}{}{%
          \ClassError{compositionalityarticle}{Please explicitly specify a paper size.
Available options: a4paper, a5paper, b5paper, letterpaper, legalpaper, executivepaper. Not
specifying a paper size can lead to inconsistent behavior when the manuscript is typeset
by the arXiv. This error can be turned off by giving the noarxiv class option}{}
        }%
}

\input{size1\@ptsize.clo}
```

```
%we patch the \usepackage command to enable the blacklisting of packages and to throw an
error if \pdfoutput=1 was not included in the document before the first usepackage
\csdef{@packageblacklist}{}
\newcommand*{\@blacklistpackage}[2][]{
        \listxadd{\@packageblacklist}{#2}%
        \ifstrempty{#1}{}{\csdef{@packageblacklisterrormessage#2}{#1 \string
\usepackage{#2}}}
}

\let\oldusepackage\usepackage
\renewcommand*{\usepackage}[2][]{
  \iftoggle{@nopdfoutputerror}
  {%
  }
  {
    \def\@pdfoutputerror{\ClassError{compositionalityarticle}{As suggested by the arXiv
(https://arxiv.org/help/submit_tex), please add \string\pdfoutput=1 within the first 5
lines of the preamble of your main LaTeX file and before the first \string\usepackage
command. Without this, the arXiv compiles your document with latex instead of pdflatex and
hyperlinks in the bibliography broken over several lines will not work properly. See
https://tex.stackexchange.com/questions/182523/publishing-to-arxiv-with-hyperlinks for
more information. If you still want to use standard latex (for example because you depend
on psfrag) instead of pdflatex despite this problem, you can disable this error by giving
the nopdfoutputerror option to compositionalityarticle. In this case please check
carefully that the links in the version of your document typeset on the arXiv, especially
those in the bibliography, work properly}{}%see also https://tex.stackexchange.com
/questions/341466/latex-macros-in-classwarning-or-classerror for why \string is necessary
    }
    \ifcsdef{pdfoutput}%
    {%
      \ifnumequal{\pdfoutput}{1}
      {}
      {\@pdfoutputerror}%
    }
    {%
      \@pdfoutputerror%
    }
  }
  \ifinlist{#2}{\@packageblacklist}{
    \ifcsdef{@packageblacklisterrormessage#2}{
      \ClassError{compositionalityarticle}{\csname
@packageblacklisterrormessage#2\endcsname}{}}{}
  }{\oldusepackage[#1]{#2}}
}

\@blacklistpackage{titlesec}

\ifbool{@twocolumn}
        {\RequirePackage[margin=2cm,bottom=3cm]{geometry}}
        {\RequirePackage[margin=3cm,bottom=3cm]{geometry}}

\@blacklistpackage{geometry}
\setlength\lineskip{1\p@}
\setlength\normallineskip{1\p@}
\renewcommand*\baselinestretch{}
\setlength\parskip{0\p@ \@plus \p@}
\@lowpenalty   51
\@medpenalty  151
\@highpenalty 301

\AfterEndPreamble{
        % avoid use of today
        \ifcsdef{today}
        {
                \iftoggle{@allowtoday}
```

```
                       {
                              \let\oldtoday\today
                              \renewcommand*{\today}{\oldtoday
\ClassWarning{compositionalityarticle}{If you intend to upload your manuscript to the
arXiv, please manually replace any use of \string\today with the upload date. The arXiv
typesets manuscripts on-demand, thus the output of \string\today may change over time}{}}
                       } % else
                       {
                              \renewcommand*{\today}{\ClassError{compositionalityarticle}{If you
intend to upload your manuscript to the arXiv, please manually replace any use of \string
\today with the upload date. The arXiv typesets manuscripts on-demand, thus the output of
\string\today may change over time. If you do not intend to upload your manuscript to the
arXiv, you may use the class option noarxiv or turn off this error by means of the
allowtoday option}{}}
                       }
              }
              {}
}

\AtBeginDocument{
         % avoid bitmap fonts by loading lmodern or at least checking for cm-super
         \IfFileExists{lmodern.sty}{
                  \RequirePackage{lmodern}
         }{
            \IfFileExists{type1ec.sty}{}{
               \iftoggle{@noarxiv}{}{%
                  \ClassError{compositionalityarticle}{Either the lmodern or the cm-super
package are required by compositionalityarticle in order to produce high quality pdf
output. Please install the lmodern package, or, if this is not possible, the cm-super
package. You can turn off this error message by giving the noarxiv class option}{}
               }
            }
         }
         % Define a revtex-style openone symbol
         \IfFileExists{bbm.sty}{
                  \RequirePackage{bbm}
                  \DeclareRobustCommand\openone{\mathbbm{1}}
         }{
                  \IfFileExists{dsfont.sty}{
                           \RequirePackage{dsfont}
                           \DeclareRobustCommand\openone{\mathds{1}}
                  }{
                           % This uses a similar technique to {revtex4-1}'s openone,
                           % namely two overstruck numeral 1s, but implemented using mboxes
                           % and math kerning as suggested by The Comprehensive LaTeX Symbol
List.
                           \DeclareRobustCommand\openone{{\mbox{\small1}\mkern-5.5mu1}}
                  }
         }
         \RequirePackage{xcolor}
         \definecolor{compositionalitypink}{RGB}{255,90,95}%compositionality pink
         \definecolor{compositionalitydarkpink}{RGB}{255,70,76}%compositionality dark pink
         \definecolor{compositionalitygray}{HTML}{555555} %compositionality gray
}

\RequirePackage{ltxcmds}

\let\origif@twocolumn\if@twocolumn
\def\class@name{ltxutil}%get rid of "You should define the class name before reading in
this package. Using default" warning from ltxutils which is loaded by ltxgrid
\if@twocolumn
         \RequirePackage{ltxgrid}%ltxgrid should be loaded before etoolbox, otherwise
terrible things can happen: https://tex.stackexchange.com/questions/343856/biblatex-
produces-incomplete-bcf-with-biber-backend?noredirect=1#comment843815_343856 but if this
is actually done, even more terrible things happen, so we partially repair what ltxgrid
```

```
messes up below...
        \newcommand*{\twocolumn}[1][]{#1\twocolumngrid}
        \newcommand*{\onecolumn}{\onecolumngrid}
\fi
\let\if@twocolumn\origif@twocolumn

\let\col@number\@colnum

\ltx@ifpackageloaded{ltxgrid}{
        %repair what ltxutils has destroyed (see https://tex.stackexchange.com/questions
/343856/biblatex-produces-incomplete-bcf-with-biber-backend)
        \patchcmd\enddocument
        {\deadcycles}
        {\let\AfterEndDocument\@firstofone
                \@afterenddocumenthook
                \deadcycles}
        {}
        {\AtEndDocument{%
                        \let\etb@@end\@@end
                        \def\@@end{%
                                \let\AfterEndDocument\@firstofone
                                \@afterenddocumenthook
                                \etb@@end}}}
}{}

\setcounter{topnumber}{2}
\renewcommand*\topfraction{.7}
\setcounter{bottomnumber}{1}
\renewcommand*\bottomfraction{.3}
\setcounter{totalnumber}{3}
\renewcommand*\textfraction{.2}
\renewcommand*\floatpagefraction{.5}
\setcounter{dbltopnumber}{2}
\renewcommand*\dbltopfraction{.7}
\renewcommand*\dblfloatpagefraction{.5}

\ifbool{@twoside}{
        \def\ps@headings{%
                \let\@oddfoot\@empty\let\@evenfoot\@empty
                \def\@evenhead{\thepage\hfil\slshape\leftmark}%
                \def\@oddhead{{\slshape\rightmark}\hfil\thepage}%
                \let\@mkboth\markboth
                \def\sectionmark##1{%
                        \markboth {\MakeUppercase{%
                                                \ifnumgreater{\c@secnumdepth}{\z@}{\thesection
\quad}{}
                                                ##1}}{}}%
                \def\subsectionmark##1{%
                        \markright {%
                                \ifnumgreater{\c@secnumdepth}{\@ne}{\thesubsection\quad}{}
                                ##1}}}%
        }{
        \def\ps@headings{%
                \let\@oddfoot\@empty
                \def\@oddhead{{\slshape\rightmark}\hfil\thepage}%
                \let\@mkboth\markboth
                \def\sectionmark##1{%
                        \markright {\MakeUppercase{%
                                                \ifnumgreater{\c@secnumdepth}{\m@ne}{\thesection
\quad}{}
                                                ##1}}}}%
}

\def\ps@myheadings{%
        \let\@oddfoot\@empty\let\@evenfoot\@empty
```

```
            \def\@evenhead{\thepage\hfil\slshape\leftmark}%
            \def\@oddhead{{\slshape\rightmark}\hfil\thepage}%
            \let\@mkboth\@gobbletwo
            \let\sectionmark\@gobble
            \let\subsectionmark\@gobble
}

\iftoggle{@titlepage}
{
            \newcommand\maketitle{\begin{titlepage}%
                    %  \let\footnotesize\small
                    \let\footnoterule\relax
                    \let \footnote \thanks
                    \null\vfil
                    \vskip 60\p@
                    \begin{center}%
                            \@maketitle
                    \end{center}\par
                    %  \@thanks
                    \vfil\null
            \end{titlepage}%
            \setcounter{footnote}{0}%
            \global\let\thanks\relax
            \global\let\maketitle\relax
            \global\let\@maketitle\relax
            %  \global\let\@thanks\@empty
            %  \global\let\@author\@empty
            %  \global\let\@date\@empty
            %  \global\let\@title\@empty
            \global\let\title\relax
            \global\let\author\relax
            \global\let\date\relax
            \global\let\and\relax
            }
}
{
            \newcommand\maketitle{\par
            \begingroup
            \renewcommand\thefootnote{\@fnsymbol\c@footnote}%
            \def\@makefnmark{\rlap{\@textsuperscript{\normalfont\@thefnmark}}}%
            \long\def\@makefntext##1{\parindent 1em\noindent
            \hb@xt@1.8em{%
            \hss\@textsuperscript{\normalfont\@thefnmark}}##1}%
            \ifbool{@twocolumn}
                    {\ifnumequal{\col@number}{\@ne}{\@maketitle}{\twocolumn[\@maketitle]}}
                    {\global\@topnum\z@    % Prevents figures from going at top of page.
                     \@maketitle}
            \thispagestyle{fancy}%\@thanks
            \endgroup
            \setcounter{footnote}{0}%
            \global\let\thanks\relax
            \global\let\maketitle\relax
            \global\let\@maketitle\relax
            %  \global\let\@thanks\@empty
            %  \global\let\@author\@empty
            %  \global\let\@date\@empty
            %  \global\let\@title\@empty
            \global\let\title\relax
            \global\let\author\relax
            \global\let\date\relax
            \global\let\and\relax
            }
}

\def\@maketitle{%
```

```
        \sffamily
        \null
        \let \footnote \thanks
        \noindent%
        \begin{minipage}{\textwidth}%
          \iftoggle{@titlepage}{\centering}{}%
          \noindent{\huge\hyphenpenalty=5000 \@printtitle\par}%
        \end{minipage}%
        \vskip 1.5em%
        \noindent\@printauthors
        \vskip 1em%
        \noindent\@printaffiliations
        \vskip 0em%
        \ifdefempty{\@date}{}{\noindent{\footnotesize\color{compositionalitygray}\@date}}%
        \par
        \vskip 1.5em
        \makeatletter%
        \begingroup
        \hypersetup{%
                pdftitle={\detokenize\expandafter{\@title}},
                pdfauthor={\@authorsonly},
                pdfkeywords={\@keywords},
                pdfcreator={LaTeX with hyperref package and class compositionalityarticle
\csname ver@compositionalityarticle.cls\endcsname},
        }%
        \endgroup
        \makeatother%
}

\setcounter{secnumdepth}{3}
\newcounter {part}
\newcounter {section}
\newcounter {subsection}[section]
\newcounter {subsubsection}[subsection]
\newcounter {paragraph}[subsubsection]
\newcounter {subparagraph}[paragraph]
\renewcommand*\thepart {\@Roman\c@part}
\renewcommand*\thesection {\@arabic\c@section}
\renewcommand*\thesubsection    {\thesection.\@arabic\c@subsection}
\renewcommand*\thesubsubsection{\thesubsection.\@arabic\c@subsubsection}
\renewcommand*\theparagraph      {\thesubsubsection.\@arabic\c@paragraph}
\renewcommand*\thesubparagraph {\theparagraph.\@arabic\c@subparagraph}
\newcommand\part{%
        \ifbool{@noskipsec}{\leavevmode}{}
        \par
        \addvspace{4ex}%
        \boolfalse{@afterindent}
        \secdef\@part\@spart}

\def\@part[#1]#2{%
\ifnumgreater{\c@secnumdepth}{\m@ne}
        {\refstepcounter{part}\addcontentsline{toc}{part}{\thepart\hspace{1em}#1}}
        {\addcontentsline{toc}{part}{#1}}
{\parindent \z@ \raggedright
\interlinepenalty \@M
\normalfont
\ifnumgreater{\c@secnumdepth}{\m@ne}{\Large\bfseries \partname\nobreakspace\thepart
\par\nobreak}{}
\huge \bfseries #2%
\markboth{}{}\par}%
\nobreak
\vskip 3ex
\@afterheading%
}
```

```
\def\@spart#1{%
        {\parindent \z@ \raggedright
                         \interlinepenalty \@M
                         \normalfont
                         \huge \bfseries #1\par}%
        \nobreak
        \vskip 3ex
        \@afterheading}

\newcommand*\section{\@startsection {section}{1}{\z@}%
  {-3.5ex \@plus -1ex \@minus -.2ex}%
  {2.3ex \@plus.2ex}%
  {\normalfont\Large\sffamily}}

\newcommand*\subsection{\@startsection{subsection}{2}{\z@}%
        {-3.25ex\@plus -1ex \@minus -.2ex}%
        {1.5ex \@plus .2ex}%
        {\normalfont\large\sffamily}}

\newcommand*\subsubsection{\@startsection{subsubsection}{3}{\z@}%
        {-3.25ex\@plus -1ex \@minus -.2ex}%
        {1.5ex \@plus .2ex}%
        {\normalfont\normalsize\sffamily}}

\newcommand*\paragraph{\@startsection{paragraph}{4}{\z@}%
        {3.25ex \@plus1ex \@minus.2ex}%
        {-1em}%
        {\normalfont\normalsize\bfseries}}

\newcommand*\subparagraph{\@startsection{subparagraph}{5}{\parindent}%
        {3.25ex \@plus1ex \@minus .2ex}%
        {-1em}%
        {\normalfont\normalsize\bfseries}}

\ifbool{@twocolumn}{\setlength\leftmargini{2em}}{\setlength\leftmargini{2.5em}}
\leftmargin  \leftmargini
\setlength\leftmarginii  {2.2em}
\setlength\leftmarginiii {1.87em}
\setlength\leftmarginiv  {1.7em}

\ifbool{@twocolumn}{
        \setlength\leftmarginv  {.5em}
        \setlength\leftmarginvi {.5em}
}{
        \setlength\leftmarginv  {1em}
        \setlength\leftmarginvi {1em}
}
\setlength  \labelsep  {.5em}
\setlength  \labelwidth{\leftmargini}
\addtolength\labelwidth{-\labelsep}
\@beginparpenalty -\@lowpenalty
\@endparpenalty   -\@lowpenalty
\@itempenalty     -\@lowpenalty
\renewcommand*\theenumi{\@arabic\c@enumi}
\renewcommand*\theenumii{\@alph\c@enumii}
\renewcommand*\theenumiii{\@roman\c@enumiii}
\renewcommand*\theenumiv{\@Alph\c@enumiv}
\newcommand*\labelenumi{\theenumi.}
\newcommand*\labelenumii{(\theenumii)}
\newcommand*\labelenumiii{\theenumiii.}
\newcommand*\labelenumiv{\theenumiv.}
\renewcommand*\p@enumii{\theenumi}
\renewcommand*\p@enumiii{\theenumi(\theenumii)}
\renewcommand*\p@enumiv{\p@enumiii\theenumiii}
\newcommand*\labelitemi{\textbullet}
```

```
\newcommand*\labelitemii{\normalfont\bfseries \textendash}
\newcommand*\labelitemiii{\textasteriskcentered}
\newcommand*\labelitemiv{\textperiodcentered}
\newenvironment{description}
{\list{}{\labelwidth\z@ \itemindent-\leftmargin
                \let\makelabel\descriptionlabel}}
{\endlist}
\newcommand*\descriptionlabel[1]{\hspace\labelsep
        \normalfont\bfseries #1}

\iftoggle{@titlepage}
{
        \newenvironment{abstract}{%
                \ifdefempty{\maketitle}{\relax{}}{\maketitle}
                \titlepage
                \null\vfil
                \thispagestyle{empty}%
                \@beginparpenalty\@lowpenalty
                \begin{center}%
                        \bfseries \abstractname
                        \@endparpenalty\@M
                \end{center}}%
        {\par\vfil\null\newpage\endtitlepage}
}{
        \newenvironment{abstract}{%
                \ifdefempty{\maketitle}{\relax{}}{\maketitle}
                \ifbool{@twocolumn}{\bf}{\vskip 1em \quotation}%
        }
        {
                \ifbool{@twocolumn}{}{\endquotation\vskip 2em}
        }
}

\newenvironment{verse}
{\let\\\@centercr
        \list{}{\itemsep        \z@
                \itemindent    -1.5em%
                \listparindent\itemindent
                \rightmargin  \leftmargin
                \advance\leftmargin 1.5em}%
        \item\relax}
{\endlist}

\newenvironment{quotation}
{\list{}{\listparindent 1.5em%
                \itemindent     \listparindent
                \rightmargin    \leftmargin
                \parsep         \z@ \@plus\p@}%
        \item\relax}
{\endlist}

\newenvironment{quote}
{\list{}{\rightmargin\leftmargin}%
        \item\relax}
{\endlist}

\newenvironment{titlepage}
{%
        \ifbool{@twocolumn}
                {\toggletrue{@restonecol}\onecolumn\newpage}
                {\togglefalse{@restonecol}\newpage}
        \thispagestyle{empty}%
        \setcounter{page}\@ne
}{%
        \iftoggle{@restonecol}
```

```
                {\twocolumn}
                {\newpage}
        \ifbool{@twoside}{}{\setcounter{page}\@ne}
}



\newcommand{\appendix}[1]{%
        \setcounter{section}{0}%
        \setcounter{subsection}{0}%
        \gdef\thesection{\@Alph\c@section}
        \section*{\appendixname}%
        #1%
}
\setlength\arraycolsep{5\p@}
\setlength\tabcolsep{6\p@}
\setlength\arrayrulewidth{.4\p@}
\setlength\doublerulesep{2\p@}
\setlength\tabbingsep{\labelsep}
\skip\@mpfootins = \skip\footins
\setlength\fboxsep{3\p@}
\setlength\fboxrule{.4\p@}
\renewcommand*\theequation {\@arabic\c@equation}
\newcounter{figure}
\renewcommand*\thefigure {\@arabic\c@figure}
\def\fps@figure{tbp}
\def\ftype@figure{1}
\def\ext@figure{lof}
\def\fnum@figure{\figurename\nobreakspace\thefigure}

\newenvironment{figure}
{\@float{figure}}
{\end@float}

\newenvironment{figure*}
{\@dblfloat{figure}}
{\end@dblfloat}

\newcounter{table}
\renewcommand*\thetable{\@arabic\c@table}
\def\fps@table{tbp}
\def\ftype@table{2}
\def\ext@table{lot}
\def\fnum@table{\tablename\nobreakspace\thetable}

\newenvironment{table}
{\@float{table}}
{\end@float}

\newenvironment{table*}
{\@dblfloat{table}}
{\end@dblfloat}

\newlength\abovecaptionskip
\newlength\belowcaptionskip
\setlength\abovecaptionskip{10\p@}
\setlength\belowcaptionskip{0\p@}
\long\def\@makecaption#1#2{%
        \vskip\abovecaptionskip
        \sbox\@tempboxa{#1: #2}%
        \ifdimgreater{\wd\@tempboxa}{\hsize}
                {#1: #2\par}
                {\global\boolfalse{@minipage}
                \hb@xt@\hsize{\hfil\box\@tempboxa\hfil}}%
```

```
            \vskip\belowcaptionskip}

\DeclareOldFontCommand{\rm}{\normalfont\rmfamily}{\mathrm}
\DeclareOldFontCommand{\sf}{\normalfont\sffamily}{\mathsf}
\DeclareOldFontCommand{\tt}{\normalfont\ttfamily}{\mathtt}
\DeclareOldFontCommand{\bf}{\normalfont\bfseries}{\mathbf}
\DeclareOldFontCommand{\it}{\normalfont\itshape}{\mathit}
\DeclareOldFontCommand{\sl}{\normalfont\slshape}{\@nomath\sl}
\DeclareOldFontCommand{\sc}{\normalfont\scshape}{\@nomath\sc}
\DeclareRobustCommand*\cal{\@fontswitch\relax\mathcal}
\DeclareRobustCommand*\mit{\@fontswitch\relax\mathnormal}

\newcommand*\@pnumwidth{1.55em}
\newcommand*\@tocrmarg{2.55em}
\newcommand*\@dotsep{4.5}
\setcounter{tocdepth}{3}

% We use a trick from Ivan Andrus (https://stackoverflow.com/a/2785740)
% to hide the "\section*{Contents}" command from the table of contents
% to avoid getting an ugly duplication of the Contents header inside
% the table itself.
%
% This trick consists of temporarily redefining \addcontentsline to
% do nothing during the expansion of the arguments to \tocless.
\newcommand{\nocontentsline}[3]{}
\newcommand{\tocless}[2]{\bgroup\let\addcontentsline=\nocontentsline#1{#2}\egroup}
\newcommand\tableofcontents{%
        \tocless{\section*}{\contentsname
                \@mkboth{%
                        \MakeUppercase\contentsname}{\MakeUppercase\contentsname}}%
        \@starttoc{toc}%
}

\newcommand*\l@part[2]{%
        \ifnumgreater{\c@tocdepth}{-2}{\relax
                \addpenalty\@secpenalty
                \addvspace{2.25em \@plus\p@}%
                \setlength\@tempdima{3em}%
                \begingroup
                \parindent \z@ \rightskip \@pnumwidth
                \parfillskip -\@pnumwidth
                {\leavevmode
                        \large \bfseries #1\hfil \hb@xt@\@pnumwidth{\hss #2}}\par
                \nobreak
                \endgroup
        }{}%
}

\newcommand*\l@section[2]{%
        \ifnumgreater{\c@tocdepth}{\z@}{
                \addpenalty\@secpenalty
                \addvspace{1.0em \@plus\p@}%
                \setlength\@tempdima{1.5em}%
                \begingroup
                \parindent \z@ \rightskip \@pnumwidth
                \parfillskip -\@pnumwidth
                \leavevmode \bfseries
                \advance\leftskip\@tempdima
                \hskip -\leftskip
                #1\nobreak\hfil \nobreak\hb@xt@\@pnumwidth{\hss #2}\par
                \endgroup
        }{}%
}

\newcommand*\l@subsection{\@dottedtocline{2}{1.5em}{2.3em}}
```

```
\newcommand*\l@subsubsection{\@dottedtocline{3}{3.8em}{3.2em}}
\newcommand*\l@paragraph{\@dottedtocline{4}{7.0em}{4.1em}}
\newcommand*\l@subparagraph{\@dottedtocline{5}{10em}{5em}}


\newcommand\listoffigures{%
        \section*{\listfigurename}%
        \@mkboth{\MakeUppercase\listfigurename}%
        {\MakeUppercase\listfigurename}%
        \@starttoc{lof}%
}


\newcommand*\l@figure{\@dottedtocline{1}{1.5em}{2.3em}}
\newcommand\listoftables{%
        \section*{\listtablename}%
        \@mkboth{%
                \MakeUppercase\listtablename}%
        {\MakeUppercase\listtablename}%
        \@starttoc{lot}%
}


\let\l@table\l@figure
% Declare a new \acknowledgements command for {revtex4-1}
% compatability.
\newcommand*{\acknowledgmentsname}{Acknowledgments}
\newcommand{\acknowledgments}[1]{%
        \section*{\acknowledgmentsname}%
        #1%
}


\newdimen\bibindent
\setlength\bibindent{1.5em}


\newenvironment{thebibliography}[1]
{%
  \makeatletter%
  \iftoggle{@noarxiv}{}{%
    \ltx@ifpackageloaded{natbib}{}{%
      \ltx@ifpackageloaded{biblatex}{
        \ClassWarning{compositionalityarticle}{Unfortunately compositionalityarticle
cannot recommend the use of BibLaTeX due to incompatibilities between locally installed
versions of BibLaTeX and the version used by the arXiv.}%
      }{%
        \ClassWarning{compositionalityarticle}{The compositionalityarticle class
recommends generating the bibliography from a BibTeX file containing DOIs with natbib in
order to ensure the generation of DOI hyperlinks}%
      }%
    }%
  }%
  \makeatother%
  \section*{\refname}%
  \@mkboth{\MakeUppercase\refname}{\MakeUppercase\refname}%
  \list{\@biblabel{\@arabic\c@enumiv}}%
  {\settowidth\labelwidth{\@biblabel{#1}}%
    \leftmargin\labelwidth
    \advance\leftmargin\labelsep
    \@openbib@code
    \usecounter{enumiv}%
    \let\p@enumiv\@empty
    \renewcommand*\theenumiv{\@arabic\c@enumiv}}%
  \sloppy
  \clubpenalty4000
  \@clubpenalty \clubpenalty
  \widowpenalty4000%
  \sfcode`\.\@m
  \setlength{\itemsep}{0pt plus 0.3ex}
```

```
}
{\def\@noitemerr
        {\@latex@warning{Empty `thebibliography' environment}}%
        \endlist}

\newcommand\newblock{\hskip .11em\@plus.33em\@minus.07em}
\let\@openbib@code\@empty

\newenvironment{theindex}{%
        \ifbool{@twocolumn}{\togglefalse{@restonecol}}{\toggletrue{@restonecol}}
        \twocolumn[\section*{\indexname}]%
        \@mkboth{\MakeUppercase\indexname}%
        {\MakeUppercase\indexname}%
        \thispagestyle{fancy}\parindent\z@
        \parskip\z@ \@plus .3\p@\relax
        \columnseprule \z@
        \columnsep 35\p@
        \let\item\@idxitem%
}
{
        \iftoggle{@restonecol}
                {\onecolumn}
                {\clearpage}
}

\newcommand\@idxitem{\par\hangindent 40\p@}
\newcommand\subitem{\@idxitem \hspace*{20\p@}}
\newcommand\subsubitem{\@idxitem \hspace*{30\p@}}
\newcommand\indexspace{\par \vskip 10\p@ \@plus5\p@ \@minus3\p@\relax}

\renewcommand*\footnoterule{%
        \kern-3\p@
        \hrule\@width.4\columnwidth
        \kern2.6\p@}

\newcommand*\@makefntext[1]{%
\parindent 1em%
\noindent
\hb@xt@1.8em{\hss\@makefnmark}#1}

\newcommand*\contentsname{Contents}
\newcommand*\listfigurename{List of Figures}
\newcommand*\listtablename{List of Tables}
\newcommand*\refname{References}
\newcommand*\indexname{Index}
\newcommand*\figurename{Figure}
\newcommand*\tablename{Table}
\newcommand*\partname{Part}
\newcommand*\appendixname{Appendix}
\newcommand*\abstractname{Abstract}

\def\today{\ifcase\month\or
                January\or February\or March\or April\or May\or June\or
                July\or August\or September\or October\or November\or December\fi
        \space\number\day, \number\year}
\setlength\columnsep{20\p@}
\setlength\columnseprule{0\p@}
\setlength{\footnotesep}{\baselineskip}
\RequirePackage{fancyhdr}
\@blacklistpackage{fancyhdr}
\pagestyle{fancy}
\renewcommand{\headrule}{}
\renewcommand{\footrule}{\vbox to 0pt{\hbox to\headwidth{\color{compositionalitygray}
\leaders\hrule\hfil}\vss}}
\fancyhf{}
```

```
\iftoggle{@accepted}
{\fancyfoot[R]{\sffamily\iftoggle{@unpublished}{\thepage}{\textcolor{compositionalitypink}
{\thepage}}}}
{\fancyfoot[C]{\sffamily\iftoggle{@unpublished}{\thepage}{\textcolor{compositionalitypink}
{\thepage}}}}
\iftoggle{@accepted}
        {\fancyfoot[L]{\usebox{\@compositionalityacceptedbox}}
        \fancyhead[R]{\textcolor{compositionalitypink}{\scriptsize{\ifcsdef{@volume}
{Volume \@volume }{} \ifcsdef{@issue}{Issue \@issue }{} ISSN 2631-4444}}}}
%

% validate the date format to be YYYY-MM-DD
\AtBeginDocument{
        \ifcsdef{@accepteddate}
        {%
                \iftoggle{@xstring}
                        {%
                                \RequirePackage{xstring}
                                \def\@dateerror{\ClassError{compositionalityarticle}{The
date in the accepted option must be given in the format YYYY-MM-DD}{}}
                                % test that we have two -s
                                \IfSubStr[2]{\@accepteddate}{-}{}{\@dateerror}
                                \IfSubStr[3]{\@accepteddate}{-}{\@dateerror}{}
                                \StrBefore[1]{\@accepteddate}{-}[\@accepteddateyear]
                                \StrBetween[1,2]{\@accepteddate}{-}{-}
[\@accepteddatemonth]
                                \StrBehind[2]{\@accepteddate}{-}[\@accepteddateday]
                                \IfDecimal{\@accepteddateyear}{}{\@dateerror}
                                \IfDecimal{\@accepteddatemonth}{}{\@dateerror}
                                \IfDecimal{\@accepteddateday}{}{\@dateerror}
                                \StrLen{\@accepteddateyear}[\@accepteddateyearlength]
                                \StrLen{\@accepteddatemonth}[\@accepteddatemonthlength]
                                \StrLen{\@accepteddateday}[\@accepteddatedaylength]
                                \ifnumcomp{\@accepteddateyearlength}{>}{3}{}{\@dateerror}
                                \ifnumcomp{\@accepteddatemonthlength}{=}{2}{}{\@dateerror}
                                \ifnumcomp{\@accepteddatedaylength}{=}{2}{}{\@dateerror}%
                        }
                        {}
        }
        {}
}

%MODIFIED 29.11


\pagenumbering{arabic}
\ifbool{@twoside}{}{\raggedbottom}
\ifbool{@twocolumn}{
        \twocolumn
        \sloppy
        \flushbottom
}{
        \onecolumn
}

%the following is mostly taken from revtex4-1 (see https://www.ctan.org/pkg/revtex4-1)
\ifbool{@twocolumn}{
        \newbox\widetext@top
        \newbox\widetext@bot
        \newenvironment{widetext}{%
                \par\ignorespaces
                \setbox\widetext@top\vbox{%
                        \hb@xt@\hsize{%
                                {\color{compositionalitygray}%
                                        \leaders\hrule\hfil
```

```
                                                    \vrule\@height6\p@}
                        }%
                }%
                \setbox\widetext@bot\hb@xt@\hsize{%
                        {\color{compositionalitygray}%
                                        \vrule\@depth6\p@
                                        \leaders\hrule\hfil}
                }%
                \onecolumngrid
                \vskip10\p@
                \dimen@\ht\widetext@top\advance\dimen@\dp\widetext@top
                \cleaders\box\widetext@top\vskip\dimen@
                \vskip6\p@
                \prep@math@patch
        }{%
                \par
                \vskip6\p@
                \setbox\widetext@bot\vbox{%
                        \hb@xt@\hsize{\hfil\box\widetext@bot}%
                }%
                \dimen@\ht\widetext@bot\advance\dimen@\dp\widetext@bot
                \cleaders\box\widetext@bot\vskip\dimen@
                \vskip8.5\p@
                \twocolumngrid\global\booltrue{@ignore}
                \booltrue{@endpe}
        }%
}{
        \newenvironment{widetext}{}{}
}


%title
\def\@printtitle{%
        {%
                        \iftoggle{@unpublished}%
                        {%
                                \@printtitletextwithappropriatefontsize%
                        }%
                        {%
                                \edef\@titleexpanded{\detokenize\expandafter{\@title}}%
                                \iftoggle{@xstring}%
                                        {\saveexploremode\exploregroups
\StrSubstitute{\@titleexpanded}{ }{\%20}[\@titleforurl]\restoreexploremode}%
                                        {\gdef\@titleforurl{\@titleexpanded}}%
                                \href{https://compositionality-journal.org
/\@shorttitle/}
                                        {%
                                                \color{compositionalitypink}{%
                                                  \@printtitletextwithappropriatefontsize
\unskip%
                                                }%
                                        }%
                        }%
                }%
}
% In the macro below we compute the appropriate font size of the title.
% We use \Huge if the title fits on one line and \huge if it extends over more
% than one line in font size \Huge
\def\@titleatfontsize#1{%
        #1%
        \begingroup%
        \raggedright%
        \iftoggle{@allowfontchangeintitle}
                {}
                {%
```

```
                              \def\selectfont{\ClassError{compositionalityarticle}{When
submitting to compositionality, you are not supposed to use \string\textbf{}, \string\bf,
\string\textit{} or other font formating commands inside \string\title{}. Please remove
all such commands from your \string\title{}. If you really have to change the font for
some part of the title you can turn off this error by giving the option
allowfontchangeintitle}{}}%solution from https://tex.stackexchange.com/questions/347596
/disallowing-textbf-it-sffamily-in-argument-of-macro-or-environment
                    }%
        \@title%
        \endgroup%
}%

\def\@printtitletextwithappropriatefontsize{%
        \newsavebox{\@titelsaveboxHuge}%
        \savebox{\@titelsaveboxHuge}{%
                \parbox[b]{\linewidth}{%
                        \@titleatfontsize{\Huge}%
                }%
        }%
        \newsavebox{\@titelsaveboxHugeoneline}%
        \savebox{\@titelsaveboxHugeoneline}{%
                \@titleatfontsize{\Huge}%
        }%
        \newsavebox{\@titelsaveboxhhuge}%
        \savebox{\@titelsaveboxhhuge}{%
                \parbox[b]{\linewidth}{%
                        \@titleatfontsize{\huge}%
                }%
        }%
        \ifdimgreater{\ht\@titelsaveboxHuge}{\ht\@titelsaveboxHugeoneline}
        {\@titleatfontsize{\huge}%\usebox{\@titelsaveboxhhuge}% using huge because \the\ht
\@titelsaveboxHuge{} is larger than \the\ht\@titelsaveboxHugeoneline{}
        }
        {\@titleatfontsize{\Huge}% using Huge because \the\ht\@titelsaveboxHuge{} is not
larger than \the\ht\@titelsaveboxHugeoneline{}
        }
}

%renew \title to allow for and ignore an optional argument
\renewcommand{\title}[2][]{\gdef\@title{#2}}
% author handling
\newcounter{@authorcounter}
\csdef{@authors}{}
\renewcommand{\author}[2][]{%
        \ifstrempty{#1}{%
                \internal@author{#2}%
        }{%
                \internal@elseauthor{#1}{#2}
        }%
        \csdef{@authorname\the@authorcounter}{#2}%
        \def\@currentauthornumber{\the@authorcounter}%
}%
\def\addauthortolabel#1#2{%
        \ifcsdef{authorswithlabel#2}{}{\csdef{authorswithlabel#2}{}}%
        \listcsxadd{authorswithlabel#2}{#1}}%
\def\internal@elseauthor#1#2{%
        \stepcounter{@authorcounter}
        \ifcsdef{@authors}{}{\csdef{@authors}{}}%
        \listadd{\@authors}{#2}%
        \forcsvlist{\addauthortolabel{\the@authorcounter}}{#1}%
        \ifbool{@startnewauthorgroup}{\csundef{@authorgroup}}{}%
        \ifcsdef{@authorgroup}{}{\csdef{@authorgroup}{}}%
        \listxadd{\@authorgroup}{\the@authorcounter}%
        \boolfalse{@startnewauthorgroup}%
}%
```

```
\def\internal@author#1{%
        \stepcounter{@authorcounter}
        \ifcsdef{@authors}{}{\csdef{@authors}{}}%
        \listadd{\@authors}{#1}%
        \ifbool{@startnewauthorgroup}{\csundef{@authorgroup}}{}
        \ifcsdef{@authorgroup}{}{\csdef{@authorgroup}{}}%
        \listxadd{\@authorgroup}{\the@authorcounter}
        \boolfalse{@startnewauthorgroup}
}
\def\@@spaceafter#1{#1 }
\def\@@@comma{\def\@@@comma{,}}
\def\@@commaspacebefore#1{\@@@comma{}#1}
\def\@printauthor#1#2{\def\footnote{\ClassError{compositionalityarticle}{You must not put
a \string\footnote{} command inside the argument of \string\author}
{}}\ifcsdef{author#1orcid}{\href{https://orcid.org/\csname author#1orcid\endcsname}
{\color{black}#2}}{#2}\ifnumcomp{\the@affiliationcounter}{>}{1}
{\textsuperscript{\forlistcsloop{\@@commaspacebefore}{author#1affiliations}\unskip}}
{}\ifnumcomp{#1}{<}{\the@authorcounter-1}{, }{\ifnumcomp{#1}{=}{\the@authorcounter-
1}{\ifnumcomp{#1}{=}{1}{ and }{, and }}{}}}
\def\@printauthors{%
        \newcounter{@authornum}%
        \large\forlistloop{\stepcounter{@authornum}%
                \ifcsdef{author\the@authornum hasextras}{%
                        \insert\footins{\footnotesize%
%                                \interlinepenalty\interfootnotelinepenalty
%                                \splittopskip\footnotesep
%                                \splitmaxdepth \dp\strutbox \floatingpenalty \@MM
                                \iftoggle{@titlepage}
                                        {\hsize\dimexpr \linewidth\relax \@parboxrestore}%
                                        {\ifbool{@twocolumn}
                                                {\hsize\dimexpr 0.5\linewidth-
0.5\columnsep\relax \@parboxrestore}
                                                {\hsize\dimexpr \linewidth\relax
\@parboxrestore}%
                                        }
                                % \flushleft%
                                % \baselineskip=0pt%
                                \@printauthorextrainfo{\the@authornum}\vspace{0.5
\baselineskip}%
                        }}{}%
                \@printauthor\the@authornum}{\@authors}%
}
\def\@@addcommabetween#1{#1, }%this adds an ugly extra comma at the end but the variant
below is not expandable and therefore leads to ugly warnings:
https://tex.stackexchange.com/questions/50978/macro-to-extract-typeset-plain-text-from-
a-command
%\def\@@addcommabetween#1{\ifdef{\firstauthoronly}{, }{\def\firstauthoronly{\empty}}#1}
\def\@authorsonly{\forlistloop{\@@addcommabetween}{\@authors}}
% affiliation handling
\newbool{@startnewauthorgroup}
\newcounter{@affiliationcounter}
\def\@addaffiliation#1#2{
        \ifcsdef{author#2affiliations}{}{\csdef{author#2affiliations}{}}%
        \listcsgadd{author#2affiliations}{#1}
}
\newcommand{\address}[2][]{\affiliation[#1]{#2}}

%for compatibility with authblk
\@blacklistpackage{authblk}
\newcommand{\affil}[2][]{
        \affiliation[#1]{#2}}
\newcommand{\affiliation}[2][]{%
        \ifstrempty{#1}{%
                \internal@affiliation{#2}%
        }{%
```

```
                        \elseinternal@affiliation{#1}{#2}
                }}%
        \def\elseinternal@affiliation#1#2{%
                \booltrue{@startnewauthorgroup}
                \ifcsdef{affiliations}{}{\csdef{affiliations}{}}%
                \expandafter\def\csname\detokenize{#2}\endcsname{#2}%
                \stepcounter{@affiliationcounter}%
                \listxadd{\affiliations}{\detokenize{#2}}%
                \csxdef{affiliation\detokenize{#2}number}{\the@affiliationcounter{}}%
                \ifcsdef{authorswithlabel#1}{%
                        \forlistcsloop{\@addaffiliation{\csname affiliation\detokenize{#2}number
\endcsname}}{authorswithlabel#1}%
                }{}%
        }
        \def\internal@affiliation#1{%
                \booltrue{@startnewauthorgroup}
                \ifcsdef{affiliations}{}{\csdef{affiliations}{}}%
                \expandafter\def\csname\detokenize{#1}\endcsname{#1} %to handle special characters
such as \'a and \l we create a macro whose name is the detokenized version of #1 and that
expands to #1 and later call it in \@printaffiliation
                \xifinlist{\detokenize{#1}}{\affiliations}{}{\stepcounter{@affiliationcounter}
\listxadd{\affiliations}{\detokenize{#1}}\csxdef{affiliation\detokenize{#1}number}
{\the@affiliationcounter{}}}%
                \forlistloop{\@addaffiliation{\csname affiliation\detokenize{#1}number\endcsname}}
{\@authorgroup}%
        }
        \def\@printaffiliation#1#2{\ifnumcomp{\the@affiliationcounter}{>}{1}
{\llap{\textsuperscript{#1}}}{}\csname #2\endcsname\ifnumcomp{#1}
{<}{\the@affiliationcounter}{\newline}{}}
        \def\@printaffiliations{%
                \ifcsdef{affiliations}{}{\csdef{affiliations}{}}%
                \newcounter{@affiliationnum}%
                \ifnumcomp{\the@affiliationcounter}{>}{1}{%
                        \settowidth{\leftskip}{\footnotesize
\textsuperscript{\the@affiliationcounter}}%
                }{}%
                {\footnotesize\color{compositionalitygray}%
                        \forlistloop{\stepcounter{@affiliationnum}\@printaffiliation
\the@affiliationnum}{\affiliations}}%
        }
        %collaboration and altaffiliation
        \newcommand{\collaboration}[1]{\author{#1}}
        \newcommand{\altaffiliation}[2][]{\affiliation{#1#2}}

        % email, homepage, and thanks handling
        % be careful - this section is highly sensitive to the positioning of the % marks
        \def\@printauthorextrainfo#1{%
                \csname @authorname#1\endcsname:
                \ifcsdef{author#1emails}
                {%
                        \forlistcsloop{\@@spaceafter}{author#1emails}%
                }
                {}%
                \ifcsdef{author#1homepages}
                {%
                        \ifcsdef{author#1emails}
                        {\unskip, }
                        {}%
                        \forlistcsloop{\@@spaceafter}{author#1homepages}%
                }
                {}%
                \ifcsdef{author#1thanks}
                {%
                        \ifcsdef{author#1emails}
                        {%
```

```
                             \ifcsdef{author#1homepages}
                             {\unskip, }
                             {\unskip, }%
                    }
                    {%
                             \ifcsdef{author#1homepages}
                             {\unskip, }
                             {}%
                    }%
                    \forlistcsloop{\@@spaceafter}{author#1thanks}%
            }
            {}%
}

\newcommand{\email}[2][]{%
        \ifcsdef{@currentauthornumber}{}{\ClassError{compositionalityarticle}{\string
\email{} may only appear after the first \string\author{} command}{}}
        \@email{#1}{\href{mailto:#2}{#2}}}
\newcommand{\homepage}[2][]{%
        \ifcsdef{@currentauthornumber}{}{\ClassError{compositionalityarticle}{\string
\homepage{} may only appear after the first \string\author{} command}{}}
        \@homepage{#1}{\href{#2}{#2}}}
\renewcommand{\thanks}[2][]{%
        \ifcsdef{@currentauthornumber}{}{\ClassError{compositionalityarticle}{\string
\thanks{} may only appear after the first \string\author{} command}{}}
        \@thanks{#1}{#2}}
\newcommand{\orcid}[2][]{%
        \ifcsdef{@currentauthornumber}{}{\ClassError{compositionalityarticle}{\string
\orcid{} may only appear after the first \string\author{} command}{}}
        \@orcid{#1}{#2}}
\def\@email#1#2{%
        \@addemail{#1#2}{\@currentauthornumber}
        \csdef{author\@currentauthornumber hasextras}{}
}
\def\@homepage#1#2{%
        \ifcsdef{@currentauthornumber}{}{\def\@currentauthornumber{0}}%in case \homepage
is called before the first author
        \@addhomepage{#1#2}{\@currentauthornumber}
        \csdef{author\@currentauthornumber hasextras}{}
}
\def\@thanks#1#2{%
        \ifcsdef{@currentauthornumber}{}{\def\@currentauthornumber{0}}%in case \thanks is
called before the first author
        \@addthanks{#1#2}{\@currentauthornumber}
        \csdef{author\@currentauthornumber hasextras}{}
}
\def\@orcid#1#2{%
        \ifcsdef{@currentauthornumber}{}{\def\@currentauthornumber{0}}%in case \orcid is
called before the first author
        \@addorcid{#1#2}{\@currentauthornumber}
}
\def\@addemail#1#2{
        \ifcsdef{author#2emails}{}{\csdef{author#2emails}{}}%
        \listcsgadd{author#2emails}{#1}
}
\def\@addhomepage#1#2{
        \ifcsdef{author#2homepages}{}{\csdef{author#2homepages}{}}%
        \listcsgadd{author#2homepages}{#1}
}
\def\@addthanks#1#2{
        \ifcsdef{author#2thanks}{}{\csdef{author#2thanks}{}}%
        \listcsgadd{author#2thanks}{#1}
}
\def\@addorcid#1#2{
        \csdef{author#2orcid}{#1}%
```

```
}


\newtoggle{@xstring}
\IfFileExists{xstring.sty}{\toggletrue{@xstring}}{\togglefalse{@xstring}}

\AtBeginDocument{
        \iftoggle{@xstring}
                {\RequirePackage{xstring}}
                {}

        \iftoggle{@accepted}
                {%
                        \newsavebox\@compositionalityacceptedbox


                        \newcommand {\logo} {\raisebox{-0.15cm}[0.1cm]
{\includegraphics[width=0.035\textwidth, height=0.035\textwidth]{logo.eps}}}}
                        \savebox\@compositionalityacceptedbox{{\sffamily\scriptsize
\logo\textcolor{compositionalitypink}{Accepted in Compositionality on
\ifcsdef{@accepteddate}{\@accepteddate}{}.  Click on the title to verify.}}}}




                {}
}
%elsearticle style extra header information
\newcommand{\ead}[2][]{
        \ifstrempty{#1}{
                \email{#2}
        }{
                \iftoggle{@xstring}
                        {\IfStrEq{#1}{url}{\homepage{#2}}{\email{#2}}}
                        {email{#2}}
        }
}
\AtEndPreamble{
        \providecommand{\@elsearticlecommandsnotsupportederror}
{\ClassError{compositionalityarticle}{The elsearticle style \string\cortext{}, \string
\corref{}, \string\fntext{}, \string\fnref{}, \string\tnotetext{}, and \string\tnoteref{}
commands are not supported by compositionalityarticle. Please refrain from using footnotes
in the title part of your document and use the \string\tahnks{} command for author
footnotes instead.}{}}
        \providecommand{\cortext}[2][]{\@elsearticlecommandsnotsupportederror}
%corresponding author information
        \providecommand{\corref}[1]{\@elsearticlecommandsnotsupportederror} %corresponding
author information reference
        \providecommand{\fntext}[2][]{\@elsearticlecommandsnotsupportederror} %author
footnote
        \providecommand{\fnref}[1]{\@elsearticlecommandsnotsupportederror} %author footnot
reference
        \providecommand{\tnotetext}[2][]{\@elsearticlecommandsnotsupportederror} %title
footnote
        \providecommand{\tnoteref}[1]{\@elsearticlecommandsnotsupportederror} %title
footnote reference
}

% set default options for hyperref to make links more pretty
\PassOptionsToPackage{colorlinks=true,hyperindex}{hyperref}

\iftoggle{@unpublished}
        {\PassOptionsToPackage{allcolors=gray}{hyperref}}
        {\PassOptionsToPackage{allcolors=compositionalitydarkpink}{hyperref}}
```

```
\ifcsdef{pdfoutput}
{
        \ifnumequal{\pdfoutput}{0}
        {}
        {\PassOptionsToPackage{breaklinks=true}{hyperref}}%setting this option produces a
warning if \pdfoutput=0
}
{}

%enable DOIs if biblatex is used by default
\PassOptionsToPackage{doi=true}{biblatex}

\AtBeginDocument{%

        \RequirePackage{hyperref}%

        \@ifpackageloaded{natbib}{%
                \setlength{\bibsep}{0pt plus 0.3ex}
                \@ifpackageloaded{doi}{}{%
                        \providecommand{\doi}[1]{}
                        \renewcommand{\doi}[1]{\href{https://doi.org/\detokenize{#1}}{DOI:
\detokenize{#1}}}%
                }%
        }{%
                \@ifpackageloaded{biblatex}{
                        \DeclareFieldFormat{doi}{\mkbibacro{DOI}\addcolon\space
\href{https://doi.org/\detokenize{#1}}{\detokenize{#1}}}
                        \setcounter{biburllcpenalty}{1000}
                        \setcounter{biburlucpenalty}{1000}
                        \setcounter{biburlnumpenalty}{1000}
                }{}%
        }
}

\def\@keywords{}
\providecommand{\keywords}{}
\renewcommand{\keywords}[1]{\def\@keywords{#1}}

\iftoggle{@amsfonts}
        {\RequirePackage{amsfonts}}
        {}
\iftoggle{@amssymb}
        {\RequirePackage{amssymb}}
        {}
\iftoggle{@amsmath}
        {\RequirePackage{amsmath}}
        {}

\iftoggle{@revtexcompatibility}
{
        \PassOptionsToPackage{numbers}{natbib}
        \PassOptionsToPackage{sort&compress}{natbib}

        \providecommand{\ao}{Appl.\  Opt.}
        \providecommand{\ap}{Appl.\  Phys.}
        \providecommand{\apl}{Appl.\ Phys.\ Lett.}
        \providecommand{\apj}{Astrophys.\ J.}
        \providecommand{\bell}{Bell Syst.\ Tech.\ J.}
        \providecommand{\jqe}{IEEE J.\ compositionality Electron.}
        \providecommand{\assp}{IEEE Trans.\ Acoust.\ Speech Signal Process.}
        \providecommand{\aprop}{IEEE Trans.\ Antennas Propag.}
        \providecommand{\mtt}{IEEE Trans.\ Microwave Theory Tech.}
        \providecommand{\iovs}{Invest.\ Ophthalmol.\ Vis.\ Sci.}
        \providecommand{\jcp}{J.\ Chem.\ Phys.}
```

```
        \providecommand{\jmo}{J.\ Mod.\ Opt.}
        \providecommand{\josa}{J.\ Opt.\ Soc.\ Am.}
        \providecommand{\josaa}{J.\ Opt.\ Soc.\ Am.\ A}
        \providecommand{\josab}{J.\ Opt.\ Soc.\ Am.\ B}
        \providecommand{\jpp}{J.\ Phys.\ (Paris)}
        \providecommand{\nat}{Nature (London)}
        \providecommand{\oc}{Opt.\ Commun.}
        \providecommand{\ol}{Opt.\ Lett.}
        \providecommand{\pl}{Phys.\ Lett.}
        \providecommand{\pra}{Phys.\ Rev.\ A}
        \providecommand{\prb}{Phys.\ Rev.\ B}
        \providecommand{\prc}{Phys.\ Rev.\ C}
        \providecommand{\prd}{Phys.\ Rev.\ D}
        \providecommand{\pre}{Phys.\ Rev.\ E}
        \providecommand{\prl}{Phys.\ Rev.\ Lett.}
        \providecommand{\rmp}{Rev.\ Mod.\ Phys.}
        \providecommand{\pspie}{Proc.\ Soc.\ Photo-Opt.\ Instrum.\ Eng.}
        \providecommand{\sjqe}{Sov.\ J.\ compositionality Electron.}
        \providecommand{\vr}{Vision Res.}
        \newenvironment{ruledtabular}{\ClassError{compositionalityarticle}{The
compositionalityarticle class does not support the ruledtabular environment. Consider
using the booktabs package for tables and the table* environment for tables that span two
columns.}{}}{}

        \AtBeginDocument{%
                \providecommand{\pacs}[1]{}
                \providecommand{\preprint}[1]{}
                \providecommand{\volumeyear}[1]{}
                \providecommand{\volumenumber}[1]{}
                \providecommand{\issuenumber}[1]{}
                \providecommand{\eid}[1]{}
                \providecommand{\startpage}[1]{}
                \def\endpage#1{\gdef\@endpage{#1}}
        }

        \AtEndPreamble{% in compatibility mode we load natbib, but only if biblatex has
not been loaded. We have to do this AtEndPreamble because natbib can not be loaded
AtBeginDocument
                \@ifpackageloaded{biblatex}{}{%
                        \@ifpackageloaded{natbib}{}{%
                                \usepackage{natbib}
                        }%
                }
                \let\@recordedbibliographystyle\relax
                \let\@origbibliographystyle\bibliographystyle
                \renewcommand{\bibliographystyle}[1]{%
                        \@origbibliographystyle{#1}%
                        \gdef\@recordedbibliographystyle{#1}%
                }
                \let\@origbibliography\bibliography
                \renewcommand{\bibliography}[1]{%
                        \ifx\@recordedbibliographystyle\relax
\bibliographystyle{plainnat}\fi
                        \ltx@ifpackageloaded{natbib}{}{%
                                \ltx@ifpackageloaded{biblatex}{}{%
                                        \ClassWarning{compositionalityarticle}{You are
manually generating your bibliography. Please make sure that all references include DOI
hyperlinks. compositionalityarticle recommends the use of BibTeX together with the natbib
package for generating the bibliography.}}}%
                        \@origbibliography{#1}}
                \providecommand\textcite[1]{\citet{#1}}
                \providecommand\onlinecite[1]{\cite{#1}}
        }
}
{
```

```
        }

        \newenvironment{acknowledgements}{\section*{Acknowledgements}}{}

        \AtBeginDocument{%
                \providecommand\text[1]{
                        \ClassError{compositionalityarticle}{To use the \string\text{} command
please load the mathtools package}{}
                }
        }

        \PassOptionsToPackage{font={small,sf}}{caption}

        \AtEndPreamble{
                \RequirePackage{caption}
        }

        \@blacklistpackage[You are not supposed to load custom font packages such as]{berasans}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{arev}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{avant}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{bera}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{bookman}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{cabin}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{chancery}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{charter}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{cmbright}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{concrete}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{courier}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{dejavu}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{droid}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{drm}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{ebgaramond}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{euler}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{fourier}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{fouriernc}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{gentium}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{helvet}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{inconsolata}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{kpfonts}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{lato}
        \@blacklistpackage[You are not supposed to load custom font packages such
as]{libertineotf}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{libertine}
        \@blacklistpackage[You are not supposed to load custom font packages such
as]{librebaskerville}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{lmodern}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{mathdesign}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{mathpazo}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{mathptmx}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{newcent}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{newtx}
        \@blacklistpackage[You are not supposed to load custom font packages such
as]{quattrocento}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgadventor}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgbonum}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgchorus}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgcursor}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgheros}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgpagella}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgschola}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{tgtermes}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{times}
        \@blacklistpackage[You are not supposed to load custom font packages such as]{yfonts}

        \iftoggle{@nopdfoutputerror}{}{\pdfoutput=0} %Set \pdfoutput=0 so that we can check later
```

```
during \usepackage whether the authors did put \pdfoutput=1 into their document, bit only
if the nopdfoutputerror was not given
\endinput
%%
%% End of file `compositionalityarticle.cls'.
```