The \flushend package

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1 Introduction
The package is used to balance columns on any page in twocolumn mode. By default it is switched on at the end of document. It is expected to work with leftcolumn footnotes (option checkfootnote) and rightcolumn top floats (option checkfloat).
To compare with the previous version the package is completely rewritten with new balancing algorithm and new options, removed dependency on other packages.

2 Usage
Just load the package to balance the last page: that’s all. To balance some page in middle of document use command \flushcolsend at that page.

Available commands:
\flushend This macro switches on column balancing on the last page. It is used by default.
\raggedend This macro switches off column balancing on the last page.
\flushcolsend This macro switches on column balancing on the current page.
\raggedcolsend This macro switches off column balancing on the current page.
\atColsBreak{tokens} Adds \langle tokens \rangle in place of the original column break (made without balancing).
Example: \atColsBreak{\vskip-2pt}
\atColsEnd{tokens} Adds \langle tokens \rangle at the end of right column.
\showcolsendrule It can be used just for debugging: adds rule to the bottom of columns.

2.1 Package options
\langle spread \rangle [default] It enables columns spreading trying to balance.
\langle nospread \rangle It disables columns spreading trying to balance.
\langle shrink \rangle [default] It enables columns shrinking trying to balance.
\texttt{noshrink} It disables columns shrinking trying to balance.

Similar options exist for single column separately:
\texttt{lspread, nospread, lshrink, nolshrink} – for left column
\texttt{rspread, norspread, rshrink, norshrink} – for right column

\texttt{checkfootnote} [default] Adds guess and checking for possible footnote on left column.

\texttt{nocheckfootnote} [default] Skips guess for possible footnote and ignores any existing one.

\texttt{checkfloat} Adds guess for top float on right column. Any box with height bigger then $5\topskip$ is considered as float. There are no user interface to change this limit except internal macro definition: \texttt{\gdef\top@@floatbox@min@default{5\topskip}}

As guess is too brutal, not accurate, and somehow dangerous in case for text misplacement it is switched off by default.

\texttt{nocheckfloat} [default] Skips guess for top float on right column.

\texttt{debug} Adds rules to the bottom of columns (just for debugging) and left column break place.
Adds some additional log info.

\texttt{nodebug} [default] Skips putting debugging lines and additional info.

\section{Implementation}

Improved balancing (at least it is expected so) is based on using possible spread and shrink in both columns checking constructed columns badness. Hard coded limit for badness is 101. Available only as internal macro: \texttt{\def\flushend@@column@badness{101}}. \texttt{pagediscards} material dimensions are used to restore original vertical skip at original columns break.

Expected usecase (with options [checkfootnote,checkfloat]):

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|footnote xxxxxxxxxx| |footnote xxxxxxxxxx|

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