The Linebreaker package

Michal Hoftich*

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1 Introduction

This package tries to prevent overflow lines in paragraphs or boxes. It changes the LuaTEX's linebreak callback, and it re-typesets the paragraph with increased values of \tolerance and \emergencystretch until the overflow doesn't happen. If that doesn't help, it chooses the solution with the lowest badness.

The advantage of this approach is that paragraphs that have not overflowed are typeset with default parameters. These are changed only for problematic paragraphs.

The code is experimental, and you may find bugs or clashes with other packages. You can send bug reports to the package's repository on Github[1].

*<michal.h21@gmail.com>

[1] https://github.com/michal-h21/linebreaker

The example document given below creates two pages by using Lua code alone. You will learn how to access TeX's boxes and counters from the Lua side, shipout a page into the PDF file, create horizontal and vertical boxes (hbox and vbox), create new nodes and manipulate the nodes links structure. The example covers the following node types: rule, whatsit, vlist, hlist and action.

Without Linebreaker

The example document given below creates two pages by using Lua code alone. You will learn how to access TeX's boxes and counters from the Lua side, shipout a page into the PDF file, create horizontal and vertical boxes (hbox and vbox), create new nodes and manipulate the nodes links structure. The example covers the following node types: rule, whatsit, vlist, hlist and action.

With Linebreaker

Figure 1: Example of Linebreaker's effect

2 Usage

There is only LaTeX package at the moment. ConTeXt and Plain TeX are not supported. You can enable the overflow paragraph handling by loading of the Linebreaker package:

```
\usepackage{linebreaker}
```

2.1 Enable and disable Linebreaker

The package owerflow handling is enabled by default. You can disable it and then re-enable using the following commands:

`\linebreakerdisable` Disable line-breaking processing. LaTeX will typeset the following paragraphs with the default values for line-breaking.

`\linebreakerenable` Re-enable line-breaking processing after it was disabled by `\linebreakerdisable`.

2.2 Change of Linebreaker parameters

`\linebreakersetup` Change settings of the line-breaking algorithm. Usage: `\linebreakersetup{`⟨*options*⟩`}`

2.2.1 Available options for the `\linebreakersetup` command

`maxcycles` Number of attempts to re-typeset the paragraph.

`maxemergencystretch` Maximal allowed value of `\emergencystretch`.

`maxtolerance` Maximal allowed value of `tolerance`.

`cubic` Use cubic method for the `tolerance` calculation. By default, `tolerance` is calculated using a linear method, with constant steps. With the cubic method, each step is larger than the previous.

`debug` Print debugging info to the terminal output.

2.2.2 Example of `\linebreakersetup` use

```
\linebreakersetup{
  maxtolerance=90,
  maxemergencystretch=1em,
  maxcycles=4
}
```

3 Historical background

The motivation to create this package was a question[2] by Frank Mittelbach on TeX.SE. His idea was to rewrite TeX's paragraph-building algorithm in Lua to allow detection of rivers and similar tasks unsupported by the standard TeX line-breaking algorithm.

As a complete rewrite of the line-breaking algorithm seemed too complicated, I tried a different approach. LuaTEX provides callbacks for working with node lists. It calls these callbacks when actions on the node lists happen, such as ligaturing, kerning, before line-breaking, after line-breaking, and callback that handles the line-breaking process.

There is a `tex.linebreak` function, which takes node list and table with TEX parameters (like `lineskip`, `baselineskip`, `tolerance`, etc.). It returns a new node list, with lines broken into horizontal boxes.

My idea is to process this returned node list, detect problems and call 'tex.linebreak' with different parameters if lines overflow. At the moment, overflow box detection works in most cases, but river detection is unusable, and it needs further corrections.

4 License

[2] http://tex.stackexchange.com/q/200989/2891

5 Changes

v0.1b, 2023-03-06

- Set maximal value of tolerance to 8189, bigger value doesn't have any effect.
- Added `cubic` method for calculating tolerance.
- Explicitly set the `tex.linebreak` parameters, to support paragraph direction and other paragraph variables.

v0.1a, 2022-03-12

- Fixed fatal error in the function that calculates width of last lines in paragraphs.

v0.1, 2022-02-19

- Initial version