Luatodonotes: Boundary Labeling for Annotations in Texts

Philipp Kindermann Fabian Lipp Alexander Wolff

Julius-Maximilians-Universität Würzburg

September 24, Graph Drawing 2014

The following text is taken from the blindtext package for LaTeX.

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label

Text for the first annotation

Text for second annotation

Text for third annotation

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Goals

- Easy for the reader to match notes and sites in text
- No crossings between leaders
- Leaders should not disturb text too much

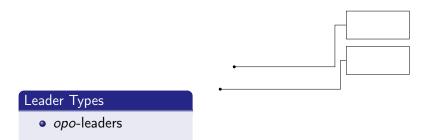
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Problem known as boundary labeling:

- Shape of the leaders
- Positions for the labels
- Labels are non-uniform!

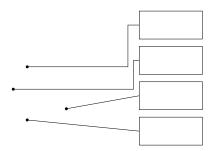
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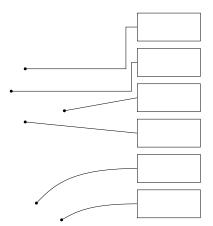
Leader Types

- opo-leaders
- s-leaders



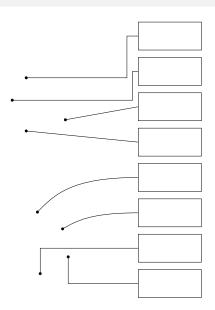
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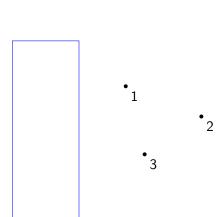
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- Bézier curves (based on s-leaders)



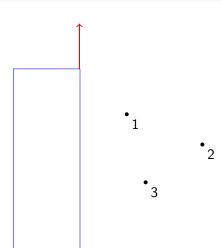
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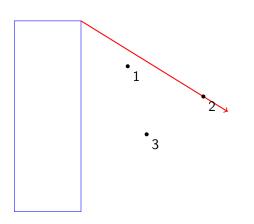




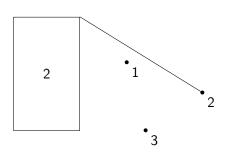
- Use upper right corner as anchor
- No gaps between labels
- No crossings between leaders
- Algorithm: Emit ray from next anchor to the top and rotate it clockwise
 [Bekos, Kaufmann, Symvonis, Wolff, 2007]



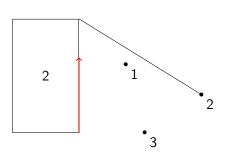
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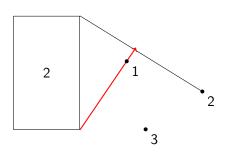
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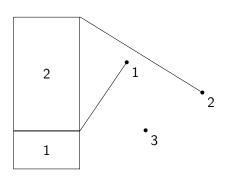
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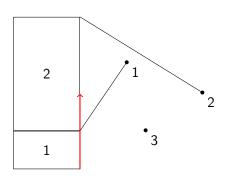
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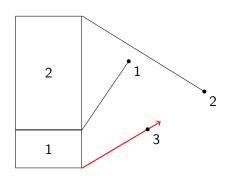
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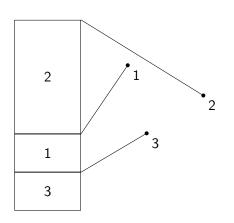
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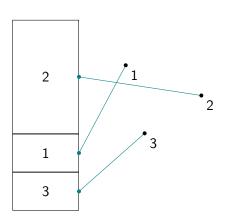
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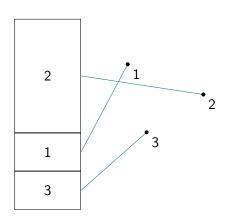
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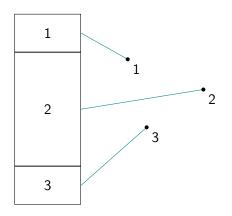
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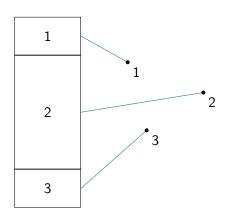
 Alternative: Anchor leader at center of label



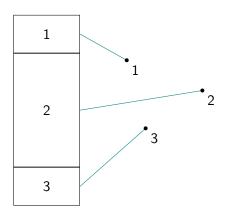
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- Here: Need to swap labels 2 and 1



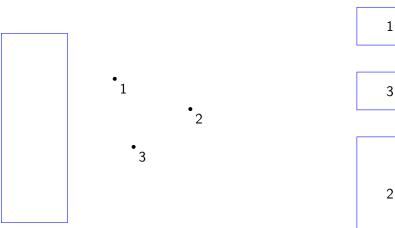
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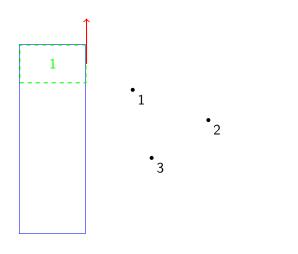
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- Easy with uniform labels



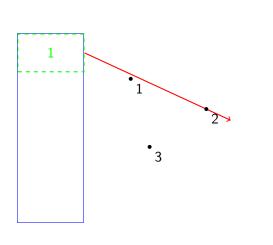
- Alternative: Anchor leader at center of label
- Here: Need to swap labels2 and 1
- Easy with uniform labels
- For non-uniform labels:
 no algorithm known to
 compute order of labels for
 given site positions and
 label heights (no gaps, no
 crossings allowed)
- Problem: we don't know position of next anchor (depends on label height)



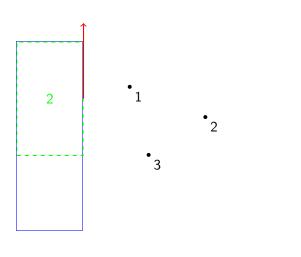




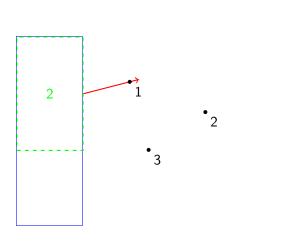


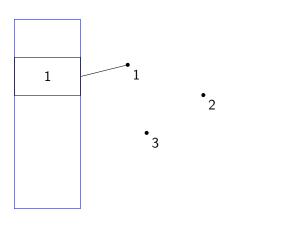




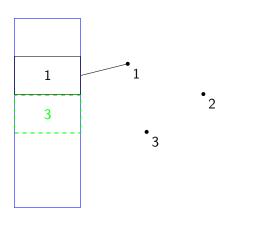




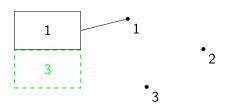








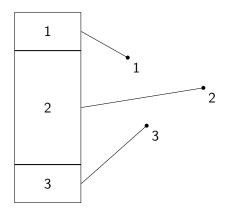




Characteristics

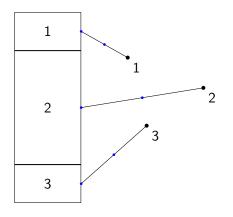
- No crossings between leaders
- Gaps between labels are possible
- Usually no gaps in real instances

Bézier curves as leaders

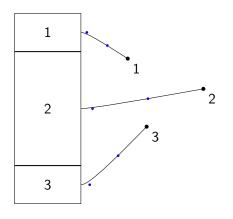


- Force-directed algorithm [Fink, Haunert, Schulz, Spoerhase, Wolff, 2012]
- Start with crossing-free straight-line drawing
- Cubic Bézier curves
- Move control points by applying forces
- Forces limited to inhibit new crossings

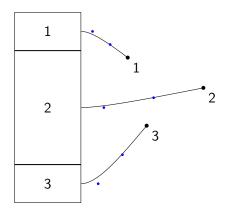
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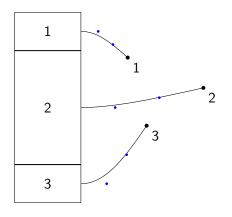
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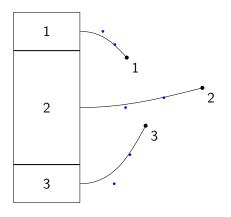
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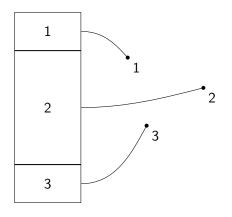
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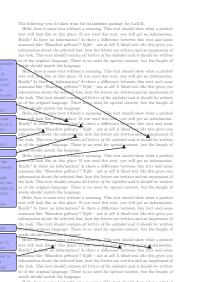
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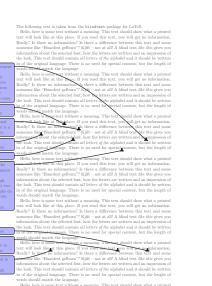


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- Using modern TEX processor LuaTEX:
 - can use high-level programming language Lua inside our LATEX package
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- Easily extensible

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How to use?

- Install package luatodonotes (available on CTAN)
- Load package:

\usepackage{luatodonotes}

- Insert notes into the text: \todo{my annotation}
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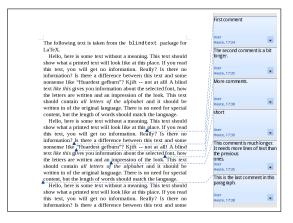
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Thank you!

APPENDIX

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