Beamer Slides using Pandoc and Markdown

Wai-Shing Luk

Fudan University

October 1, 2023

Introduction

`pandoc`

`pandoc-crossref` filter

`pandoc-citeproc` filter

Introduction

Why and Why not

Why Markup Language?

- Separate "content" with "style".

Why Pandoc and Beamer?

- For professional presentation.
- Tikz diagrams.
- Cross reference

A simple example `intro.md`

```
---
title: Beamer Slides using Pandoc and Markdown
author: Wai-Shing Luk
bibliography: papers.bib
...

# Introduction {#sec:intro}

## Why and Why not

### Why Markup Language?

- Separate "content" with "style".

### Why Beamer?

- For professional presentation.
- Tikz diagrams.
```

pandoc

pandoc

Pandoc is a Haskell library for converting from one markup format to another[1], and a command-line tool that uses this library. It can read Markdown and write LaTeX or Beamer.

To compile:

```
$ pandoc -s -t beamer beamer.yaml intro.md -o intro.tex
```

or directly to a pdf file:

```
$ pandoc -t beamer beamer.yaml intro.md -o intro.pdf
```

---

[1] This is a footnote.

A simple header `beamer.yaml`

```yaml
---
fontsize: 10pt
classoption:
  - serif,onlymath
institute: Fudan University
date: \today
link-citations: true
colorlinks: true
header-includes:
  - \usetheme{default}
  - \usepackage{tikz,pgf,pgfplots}
  - \usetikzlibrary{arrows}
  - \definecolor{qqqqff}{rgb}{0.,0.,1.}
  - \newcommand{\columnsbegin}{\begin{columns}}
  - \newcommand{\columnsend}{\end{columns}}
  - \newcommand{\col}[1]{\column{#1}}
  - \pgfdeclareimage[height=0.5cm]{fudan-logo}{fudan-logo.jpg}
  - \logo{\pgfuseimage{fudan-logo}}
...
```

Render Mathematical Equations using LaTeX

```
Consider the following problem:

$$\begin{array}{ll}
  \text{minimize}    & f_0(x), \\
  \text{subject to}  & F(x) \succeq 0,
\end{array}$$ {#eq:semidef}

- $F(x)$: a matrix-valued function
- $A \succeq 0$ denotes $A$ is
  positive semidefinite.
```

Consider the following problem:

$$
\begin{array}{ll}
\text{minimize} & f_0(x), \\
\text{subject to} & F(x) \succeq 0,
\end{array}
\tag{1}
$$

- ▶ $F(x)$: a matrix-valued function
- ▶ $A \succeq 0$ denotes A is positive semidefinite.

How to make a two-column slide

```
\columnsbegin

\col{0.5\textwidth}

  Left-hand side

\col{0.5\textwidth}

  Right-hand side

\columnsend
```

Figures

An image occurring by itself in a paragraph will be rendered as a figure with a caption.
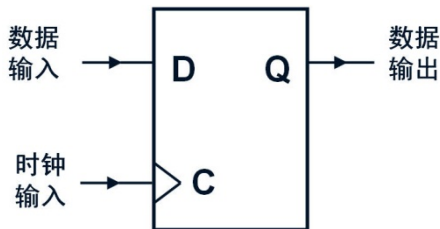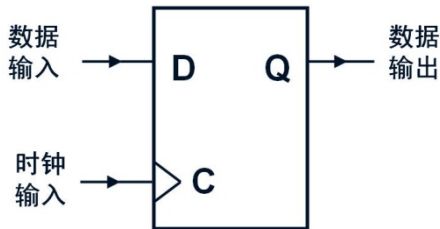

Figure 1: This is the caption

(source)

`![This is the caption](media/image2.jpeg){#fig:figure0}`

Figures (cont'd)

If you just want a regular inline image, just make sure it is not the only thing in the paragraph. One way to do this is to insert a nonbreaking space after the image:

(source)

`![No caption](media/image2.jpeg)`\

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
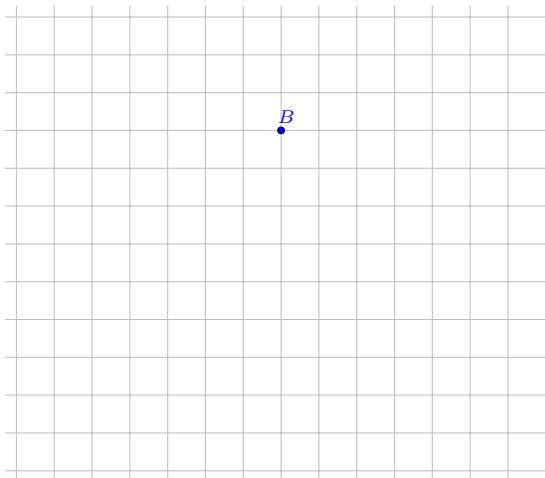
Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz


```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
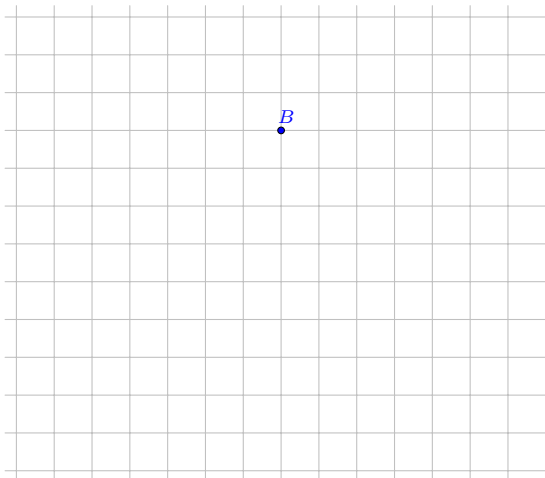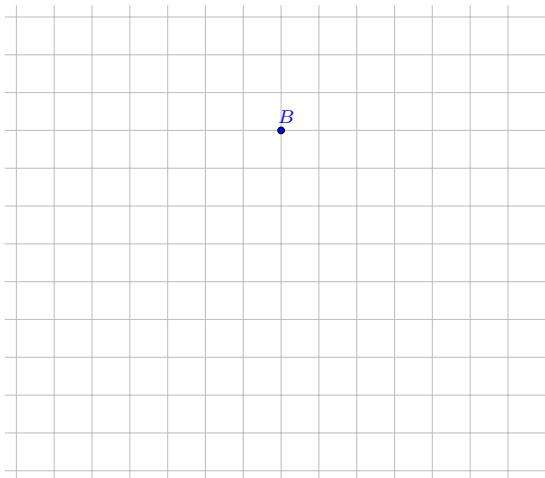
Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz


```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

Figure 2: Example of constructing the polar of a point

```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
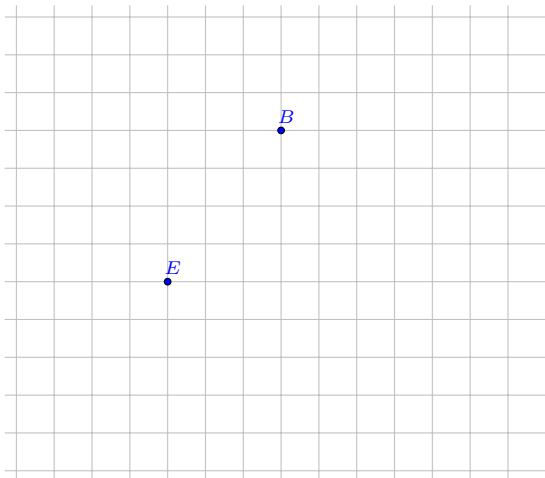

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
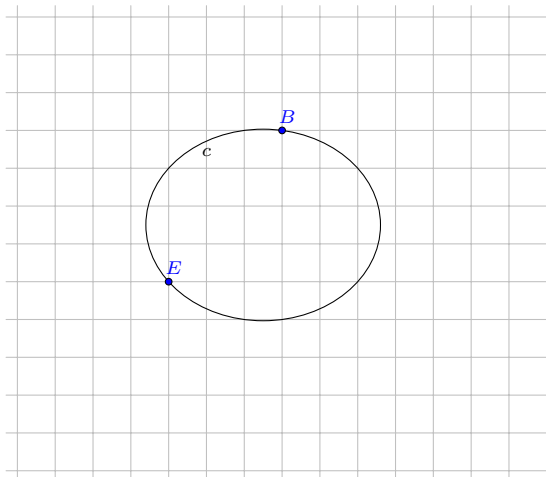

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```


Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
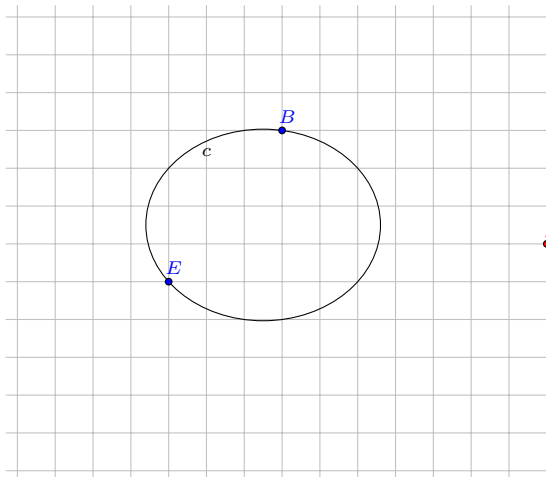

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz


```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
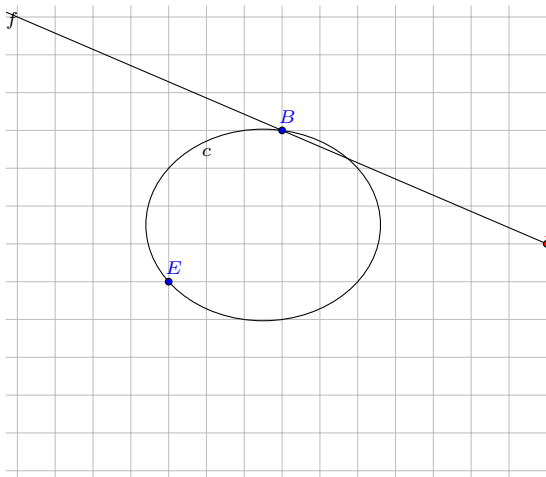
Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz


```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
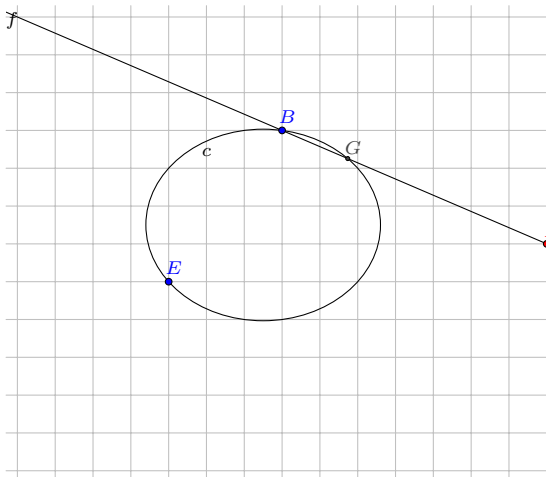
Figure 2: Example of constructing the polar
of a point

Render Diagrams using Tikz

Figure 2: Example of constructing the polar of a point

```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
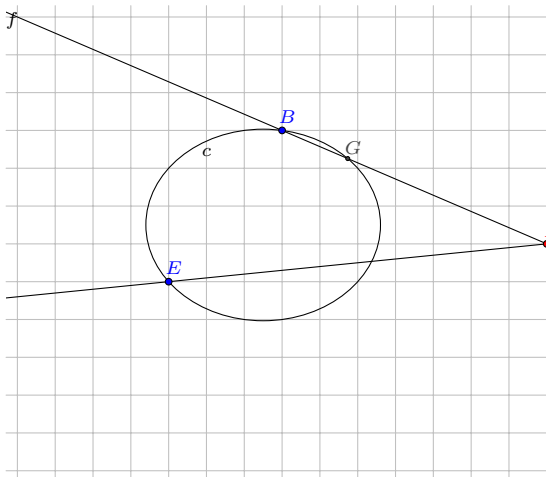
Render Diagrams using Tikz

```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```


Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
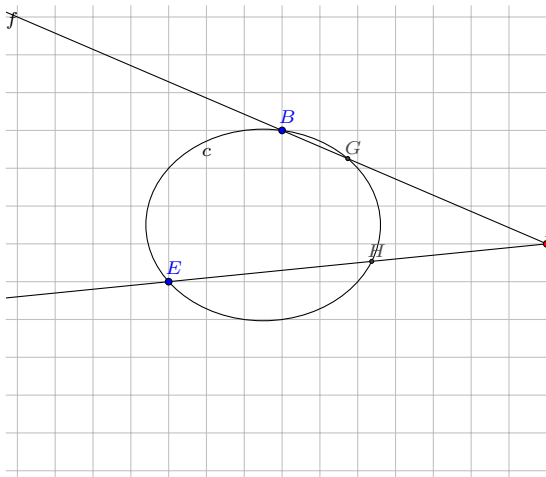

Figure 2: Example of constructing the polar
of a point

Render Diagrams using Tikz


```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
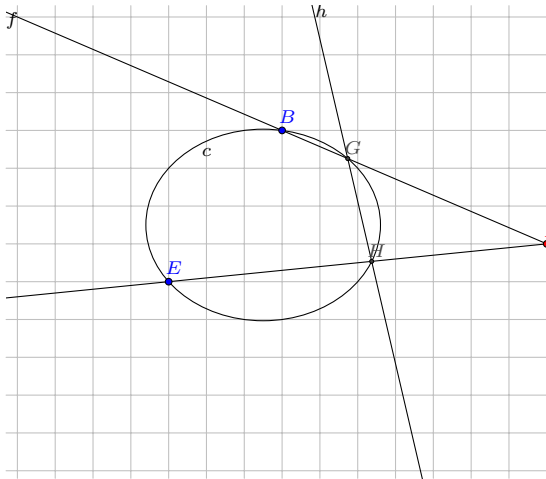
Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
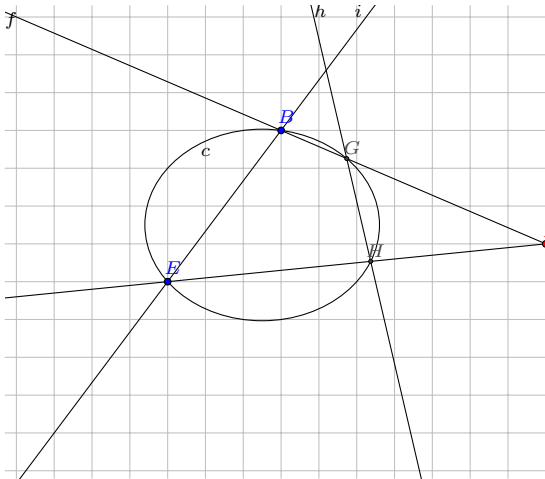

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```


Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
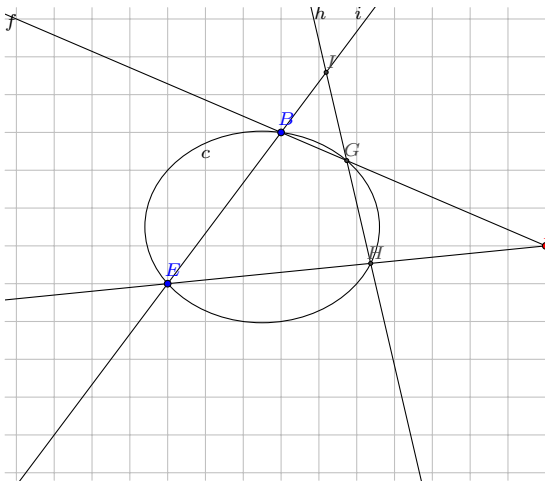

Figure 2: Example of constructing the polar of a point

Render Diagrams using Tikz

```latex
\begin{figure}[hp]
\centering
\input{pole2polar.tikz}
\caption{Example of constructing
    the polar of a point}%
\label{fig:pole2polar}
\end{figure}
```
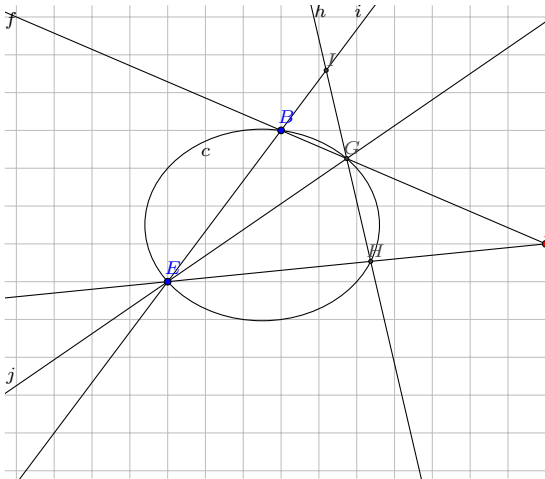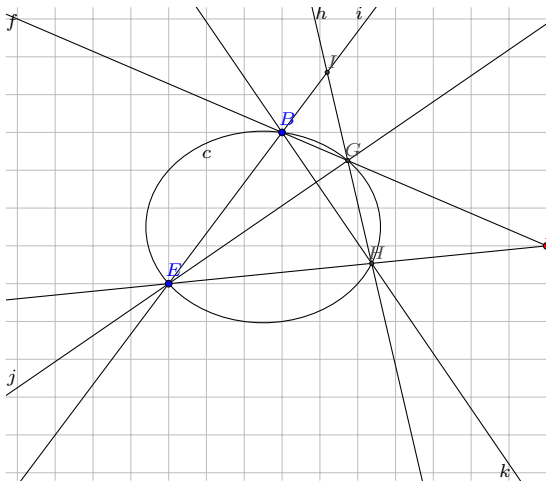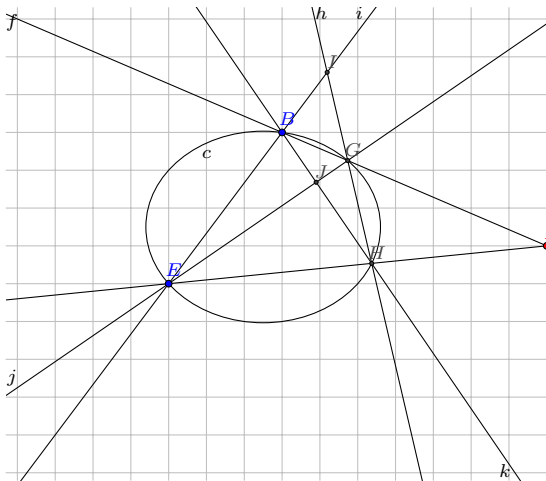

Figure 2: Example of constructing the polar of a point

Table

Simple tables can be generated using Markdown.

```
| Costs        | 28nm      | 20nm         |
| ------------ | --------- | ------------ |
| Fab Costs    | 3B        | 4B - 7B      |
| Process R&D  | 1.2B      | 2.1B - 3B    |
| Mask Costs   | 2M - 3M   | 5M - 8M      |
| Design Costs | 50M - 90M | 120M - 500M  |

: Fab, process, mask, and design
  costs {#tbl:fab}
```

Table 1: Fab, process, mask, and design costs

Costs	28nm	20nm
Fab Costs	3B	4B - 7B
Process R&D	1.2B	2.1B - 3B
Mask Costs	2M - 3M	5M - 8M
Design Costs	50M - 90M	120M - 500M

pandoc-crossref filter

pandoc-crossref filter

With this filter, you can cross-reference figures (see Fig. 1 and Fig. 2), display equations (see Eq. (1)), tables (see Table 1) and sections **??**, **??**

There is also support for code blocks, for example, **????**.

To compile:

```
$ pandoc -F pandoc-crossref -t beamer beamer.yaml \
  crossref.yaml beamer.md -o intro.pdf
```

A sample `crossref.yaml`

```yaml
---
cref: True
codeBlockCaptions: True
lofTitle: "## List of Figures"
lotTitle: "## List of Tables"
autoSectionLabels: True
figureTemplate: $$t$$
tableTemplate: $$t$$
figPrefix:
  - "Fig."
eqnPrefix:
  - "Eq."
tblPrefix:
  - "Table"
lstPrefix:
  - "Listing"
secPrefix:
  - "§"
...
```

Code blocks

There are a couple options for code block labels. Those work only if code block id starts with `lst:`, e.g. `{#lst:label}`

caption attribute

caption attribute will be treated as code block caption. If code block
has both id and caption attributes, it will be treated as numbered
code block.

```haskell
main :: IO ()
main = putStrLn "Hello World!"
```

(source)

```
{#lst:captionAttr .haskell caption="Listing caption A"}
```

Table-style captions

Enabled with `codeBlockCaptions` metadata option. If code block is immediately adjacent to paragraph, starting with `Listing:` or `:`, said paragraph will be treated as code block caption.

Listing: Listing caption B

```
main :: IO ()
main = putStrLn "Hello World!"
```

pandoc-citeproc filter

Bibliography

- See Aalst, Weijters, and Maruster (2004), or
- See (Baldi et al. 2008; Canfora and Cerulo 2005).

(source)

```
- See @Aalst-etal_2004, or
- See [@Baldi-etal_2008;@Canfora-Cerulo_2005a].
```

To compile:

```
$ pandoc -F pandoc-crossref --citeproc -t beamer \
  beamer.yaml crossref.yaml beamer.md -o intro.pdf
```

References I

Aalst, W. van der, T. Weijters, and L. Maruster. 2004. "Workflow Mining: Discovering Process Models from Event Logs." *IEEE Transactions on Knowledge and Data Engineering* 16 (9): 1128–42. https://doi.org/10.1109/TKDE.2004.47.

Baldi, Pierre F, Cristina V Lopes, Erik J Linstead, and Sushil K Bajracharya. 2008. "A Theory of Aspects as Latent Topics." In *ACM Sigplan Notices*, 43:543–62. 10. ACM. https://doi.org/10.1145/1449955.1449807.

Canfora, G., and L. Cerulo. 2005. "Impact Analysis by Mining Software and Change Request Repositories." In *11th IEEE International Software Metrics Symposium (METRICS'05)*, 29. Como, Italy: IEEE. https://doi.org/10.1109/METRICS.2005.28.