



Đề cương luận văn thạc sĩ

Nghiên cứu phát triển kỹ thuật đếm số phần tử
trên dòng dữ liệu

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Người hướng dẫn khoa học:

PGS. TS. THOẠI NAM

1. Giới thiệu
2. Mục tiêu, đối tượng và giới hạn nghiên cứu
3. Phát biểu bài toán
4. Kiến thức nền tảng
5. Phương pháp thực hiện

Giới thiệu

The **metropolis** theme is a Beamer theme with minimal visual noise inspired by the HSRM Beamer Theme by Benjamin Weiss.

Enable the theme by loading

```
\documentclass{beamer}  
\usetheme{metropolis}
```

Note, that you have to have Mozilla's *Fira Sans* font and XeTeX installed to enjoy this wonderful typography.

Sections group slides of the same topic

```
\section{Elements}
```

for which **metropolis** provides a nice progress indicator ...

Mục tiêu, đối tượng và giới hạn nghiên cứu

Metropolis title formats

metropolis supports 4 different title formats:

- Regular
- SMALL CAPS
- ALL SMALL CAPS
- ALL CAPS

They can either be set at once for every title type or individually.

This frame uses the `smallcaps` title format.

Potential Problems

Be aware that not every font supports small caps. If for example you typeset your presentation with pdfTeX and the Computer Modern Sans Serif font, every text in small caps will be typeset with the Computer Modern Serif font instead.

This frame uses the `allsmallcaps` title format.

Potential problems

As this title format also uses small caps you face the same problems as with the `smallcaps` title format. Additionally this format can cause some other problems. Please refer to the documentation if you consider using it.

As a rule of thumb: just use it for plaintext-only titles.

This frame uses the `allcaps` title format.

Potential Problems

This title format is not as problematic as the `allsmallcaps` format, but basically suffers from the same deficiencies. So please have a look at the documentation if you want to use it.

Phát biểu bài toán

The theme provides sensible defaults to
`\emph{emphasize}` text, `\alert{accent}` parts
or show `\textbf{bold}` results.

becomes

The theme provides sensible defaults to *emphasize* text, **accent** parts or
show **bold** results.

Font feature test

- Regular
- *Italic*
- SMALL CAPS
- **Bold**
- **Bold Italic**
- **Bold Small Caps**
- Monospace
- *Monospace Italic*
- Monospace Bold
- *Monospace Bold Italic*

Items

- Milk
- Eggs
- Potatoes

Enumerations

1. First,
2. Second and
3. Last.

Descriptions

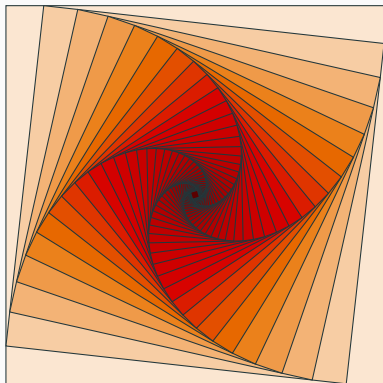
PowerPoint Meeh.
Beamer Yeeeha.

- This is important

- This is important
- Now this

- This is important
- Now this
- And now this

- This is really important
- Now this
- And now this



Hình 1: Rotated square from texample.net.

Bảng 1: Largest cities in the world (source: Wikipedia)

City	Population
Mexico City	20,116,842
Shanghai	19,210,000
Peking	15,796,450
Istanbul	14,160,467

Blocks

Three different block environments are pre-defined and may be styled with an optional background color.

Default

Block content.

Alert

Block content.

Example

Block content.

Default

Block content.

Alert

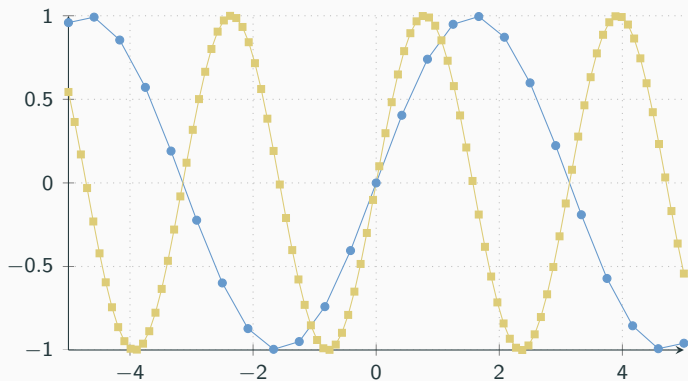
Block content.

Example

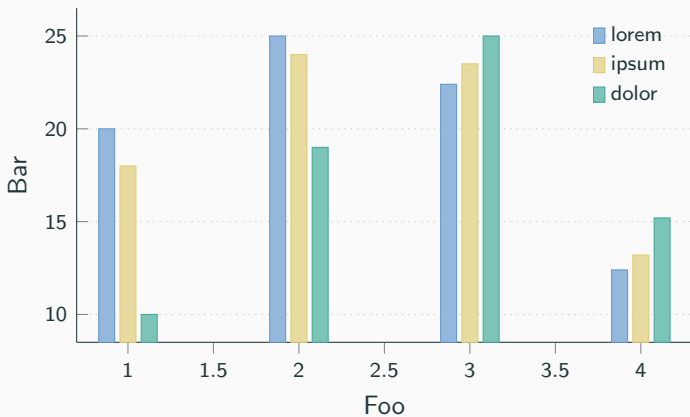
Block content.

$$e = \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n$$

Line plots



Bar charts



Veni, Vidi, Vici

metropolis defines a custom beamer template to add a text to the footer. It can be set via

```
\setbeamertemplate{frame footer}{My custom footer}
```

Some references to showcase `[allowframebreaks]` `[2, 4, 1, 3, 5]`

Kiến thức nền tảng

Get the source of this theme and the demo presentation from

`github.com/matze/mtheme`

The theme *itself* is licensed under a Creative Commons Attribution-ShareAlike 4.0 International License.



Phương pháp thực hiện

Summary

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Questions?

Backup slides

Sometimes, it is useful to add slides at the end of your presentation to refer to during audience questions.

The best way to do this is to include the `appendixnumberbeamer` package in your preamble and call `\appendix` before your backup slides.

metropolis will automatically turn off slide numbering and progress bars for slides in the appendix.



Y. Chabchoub and G. Heébrail.

Sliding hyperloglog: Estimating cardinality in a data stream over a sliding window.

In *2010 IEEE International Conference on Data Mining Workshops*, pages 1297–1303. IEEE, 2010.



M. Durand and P. Flajolet.

Loglog counting of large cardinalities.

In *Algorithms-ESA 2003: 11th Annual European Symposium, Budapest, Hungary, September 16-19, 2003. Proceedings 11*, pages 605–617. Springer, 2003.



O. Ertl.

Exaloglog: Space-efficient and practical approximate distinct counting up to the exa-scale.

arXiv preprint arXiv:2402.13726, 2024.



P. Flajolet, É. Fusy, O. Gandouet, and F. Meunier.

Hyperloglog: the analysis of a near-optimal cardinality estimation algorithm.

Discrete mathematics & theoretical computer science, (Proceedings), 2007.



S. Heule, M. Nunkesser, and A. Hall.

Hyperloglog in practice: Algorithmic engineering of a state of the art cardinality estimation algorithm.

In *Proceedings of the 16th International Conference on Extending Database Technology*, pages 683–692, 2013.