

[Extended Presentation Title]

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[Dissertation/Thesis Defense]
(Date)



THIRUVANANTHAPURAM

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Beamer Basics

Welcome to \LaTeX beamer.

- $\sum_{i=1}^m i^2 = \frac{m(m+1)(2m+1)}{6}$
- `$\sum_{i=1}^m i^2 = \frac{m(m+1)(2m+1)}{6}$`

This is a Frame Title

- Frames function as slides. All content must clearly be defined within a `\begin{frame}... \end{frame}` environment.

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Block name

This is a block. Similar to frames, all content within a block must be defined within a `\begin{block}... \end{block}`.

Types of Blocks

- Here are two blocks in separate columns. Columns in beamer work differently compared to the `multicols` environment in other document classes.

Column 1:

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa.

Column 2:

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetur id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

② Here is an example of a lemma.

Lemma 1

Lemma Name: Body of Lemma.

Non-Numbered Equation:

$$f = -X_1^2 - X_2^2 - \dots - X_\lambda^2 + X_{\lambda+1}^2 + \dots + X_m^2 + c$$

Numbered Equations - Single and Grouped:

$$J(u) := \int_{\Omega} \left(\frac{1}{2} |\nabla u|^2 - F(u) \right) dx \quad (1)$$

$$\begin{aligned} \Rightarrow \therefore J'(u)(v) &= \langle \nabla J(u), v \rangle = \int_{\Omega} \{ (\nabla u \cdot \nabla v - f(u)v) \} dx, \\ &= \int_{\Omega} (\Delta u - f(u)) \cdot v dx, \quad \forall v \in H \end{aligned} \quad (2)$$

- 3 Here is a definition block.

Definition 2 (Term being defined)

Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo.

- 4 Here is a remark block.

Remark

Such blocks are suitable for **pointing out or revising a fact**. You can recall elements as shown, Lemma 1. Note the use of the \sim character between words to prevent line-breaks.

- 5 Here is an example of an example block.

Example 3

Below is an example of a cited theorem. Interactable cites take you to the bibliography at the end of the document.

Theorem 4 (**Catalan-Mihăilescu Theorem [Mih04]**)

Let $p > q$ be prime numbers. Then the equation

$$x^p - y^q = 1 \tag{3}$$

has no solutions in positive integers x and y , other than $3^2 - 2^3 = 1$.

- ⑥ Block environments such as `block`, `alertblock` and `exampleblock` can be used for creating other elements like so.

Notation

We denote the set of continuously differentiable functions within the domain $[a, b]$ as $C^1[a, b]$.

Special Case 1:

The most notable exception to the general rule that uncountable sets must have non-zero measures is the **Cantor set**, which consists of iteratively deleting the open middle third of an interval, say, $[0, 1]$.

Hence, the measure of the removed interval length:

$$m([0, 1] - C_{[0,1]}) = \sum_{n=0}^{\infty} \frac{2^n}{3^{n+1}} = \frac{1}{3} \left(\frac{1}{1 - \frac{2}{3}} \right) = 1 \quad (\text{SC1})$$

$$\Rightarrow m(C_{[0,1]}) = 1 - m([0, 1] - C_{[0,1]}) = 0$$

\therefore by (SC1), the measure of our Cantor set is zero.

Overlays for Uncovering Lists Piecewise/Itemwise

Here is an example of a list being uncovered piecewise.

- 1 Item 1 comes first.

Here is an example of a list being uncovered piecewise.

- 1 Item 1 comes first.
- 2 Item 2 comes second.

Here is an example of a list being uncovered piecewise.

- 1 Item 1 comes first.
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- 3 Item 3a and
- 4 Item 3b both appear at the same time.

Here is an example of a list being uncovered piecewise.

- 1 Item 1 comes first.
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- 4 Item 3b both appear at the same time.

Remark

Blocks and other objects can be uncovered as well.

Proofs Blocks over Proof Block

We used the custom-defined block '**proofs**' instead of '**proof**' when our proof exceeds one slide as this allows us to chain it as shown.

Long Proof.

- 1 Suspendisse vel felis. Ut lorem lorem, interdum eu, tincidunt sit amet, laoreet vitae, arcu. Aenean faucibus pede eu ante. Praesent enim elit, rutrum at, molestie non, nonummy vel, nisl. Ut lectus eros, malesuada sit amet, fermentum eu, sodales cursus, magna. Donec eu purus.

Long Proof (Cont.)

- Quisque vehicula, urna sed ultricies auctor, pede lorem egestas dui, et convallis elit erat sed nulla. Donec luctus. Curabitur et nunc. Aliquam dolor odio, commodo pretium, ultricies non, pharetra in, velit. Integer arcu est, nonummy in, fermentum faucibus, egestas vel, odio.

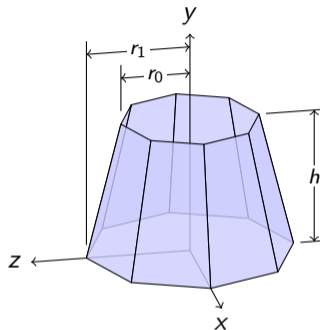


Figure 1: 3D Cone designed by Gene R., see [Images/Figures/3D_Cone.tex](#)

The 'proofs' blocks also allow us to throw in text in between blocks like so...

Remark

... as well as remarks, definitions and so on.

Long Proof (Cont.)

- Remember, discontinuous lists and piece-wise overlays work here as well.

Vestibulum luctus nibh at lectus. Sed bibendum, nulla a faucibus semper, leo velit ultricies tellus, ac venenatis arcu wisi vel nisl. Vestibulum diam.

Remark

End your proofs block with the '`\qed`' command to signify the end of the proof.

Another helpful feature is the inclusion of appendices, which allow you to add supplementary slides to your presentation. This is especially useful when you want to keep ready any prerequisite data or case studies that may fall outside the immediate scope of the presentation topic.

One can easily navigate to an appendix topic like so (A1) or [▶ Appendix I: Case Study](#)

This does not contribute to the total slides displayed in the top left corner; the appendix and reference slides are accounted for separately at the end.

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Mention your findings here.

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Happy T_EXing!

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Q&A

Thank You!

I will now be taking questions.

References I

- [BL88] A. Bahri and P. L. Lions. “Morse index of some min-max critical points. I. Application to multiplicity results”. In: *Communications on Pure and Applied Mathematics* 41 (8 Dec. 1988), pp. 1027–1037. ISSN: 00103640. DOI: [10.1002/cpa.3160410803](https://doi.org/10.1002/cpa.3160410803).
- [Kes89] S. Kesavan. *Topics in Functional Analysis and Applications*. Wiley, 1989. ISBN: 9780470210505. URL: <https://books.google.co.in/books?id=2U41AAAACAAJ>.
- [Mih04] Preda Mihăilescu. “Primary cyclotomic units and a proof of Catalan’s conjecture”. In: *Journal für die reine und angewandte Mathematik (Crelles Journal)* 2004 (Jan. 2004). DOI: [10.1515/crll.2004.048](https://doi.org/10.1515/crll.2004.048).

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4 Appendix I

5 Appendix II

Appendix I: Title

Remark

This is what an appendix would look like. It utilizes the same structure as the rest of the presentation (*section, subsection, subsubsection, etc*).

Example

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

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4 Appendix I

5 Appendix II

Appendix II: Title

Relevant Title

Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi.

Example of Appendix II

Quisque ullamcorper placerat ipsum. Cras nibh. Morbi vel justo vitae lacus tincidunt ultrices. Lorem ipsum dolor sit amet, consectetur adipiscing elit. In hac habitasse platea dictumst. Integer tempus convallis augue. Etiam facilisis. Nunc elementum fermentum wisi. Aenean placerat. Ut imperdiet, enim sed gravida sollicitudin, felis odio placerat quam, ac pulvinar elit purus eget enim. Nunc vitae tortor. Proin tempus nibh sit amet nisl. Vivamus quis tortor vitae risus porta vehicula.