Mathematical Foundations of Spectral Graph Theory.

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2025 年 9 月 4 日

I Introduction

I-I Graph Theory

What is a graph?

This is an unofficial template for Florida State Mathematics poster presentation prepared by Rafiq Islam[1]. Here is how you use plain text. Here is how you can use a block to write some important information Rafiq Islam. "Florida State University Beamer Presentation Design (Unofficial)". In: *Department of Mathematics* (2025)

Graph Theory

Spectral graph theory studies properties of a graph in relationship to the eigenvalues and eigenvectors of matrices associated with the graph, such as the adjacency matrix A, degree matrix D, and Laplacian $L = D - A$.

[1] Rafiq Islam. *FSU Mathematics General Poster Design*. Tech. rep. Version 1. Florida State University, 2025.

Example of itemize and enumerate

Itemize

- This is how you can start `itemize`
- Instead of this right-pointed arrow, if you want bullets, then see the instruction in line 6

Enumerate

1. This is how you can start `enumerate`
2. Second item

I-II Why Graph Theory

Why do we need this?

This is an unofficial template for the Florida State Mathematics poster presentation prepared by Rafiq Islam[2]. Here is how you use plain text. Spectral graph theory studies properties of a graph in relationship to the eigenvalues and eigenvectors of matrices associated with the graph, such as the adjacency matrix A, degree matrix D, and Laplacian $L = D - A$.

[2] An example of footnote

II Methodology

Mathematical Background

This section has three slides. So in the top right, we see 3 dots. Highlighted one indicates the current slide.
Let $G = (V, E)$ be an undirected graph. The Laplacian matrix is given by

$$L_{ij} = \begin{cases} \deg(v_i) & \text{if } i = j, \\ -1 & \text{if } i \neq j \text{ and } (i, j) \in E, \\ 0 & \text{otherwise.} \end{cases}$$

1. The eigenvalues of L reveal key structural properties such as connectivity.

A Tikz Picture Example

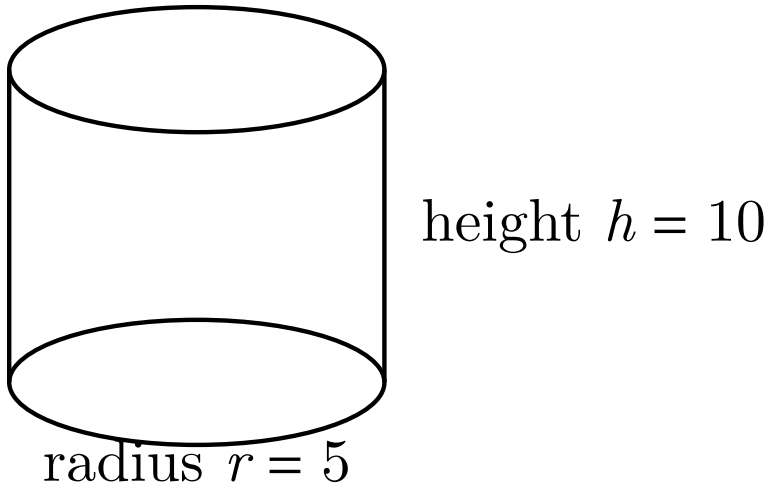

图 1: Spherical Cylinder with radius $r = 5$m and height $h = 10$ m

Other Plots

图 2: Florida State Seminole (Photo credit: Wikipedia)

III Reference

Bibliography


Islam, Rafiq. “Florida State University Beamer Presentation Design (Unofficial)”. In: *Department of Mathematics* (2025).


— .*FSU Mathematics General Poster Design*. Tech. rep. Version 1. Florida State University, 2025.