# Proof-Based Math Readings Session: Graph Theory

2025 Summer

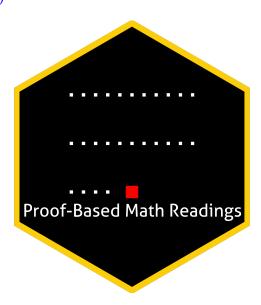
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### 0 Motivation

- Proof-Based Math Readings is a free and independent online reading group where we study mathematics required in economics master's/PhD programs using an intuitive approach.
- This session of the reading group is on *Graph Theory*.

### 1 Prerequisites

- CGPA: 3.00/4.00.
- Proof resources below are the prerequisites for this session.
- Please use the Application Form to join our reading group anytime.
- Applicants are informed about their application results within a week via email.

#### 2 Format

- This session takes 12 weeks.
- We discuss the topics/exercises that we struggle with at Proof-Based Math Readings [Discord].
- We do not have face-to-face/online meetings due to the size of the group.
- Members are expected to read the chapters, and watch the chapter videos from the book's playlist.

#### 3 Resources

#### 3.1 Main Book and Main Book's Playlist

A First Course in Graph Theory - Gary Chartrand, Ping Zhang (2012) is our main book because it is well-structured and well-written.

Mikhail Lavrov's playlist is our playlist because the narrative is great.

- A First Course in Graph Theory Gary Chartrand, Ping Zhang (2012)
- ▶ A First Course in Graph Theory Gary Chartrand, Ping Zhang (2012, Playlist by Mikhail Lavrov)
- A First Course in Graph Theory Gary Chartrand, Ping Zhang (2012, Playlist by Wrath of Math)
- A First Course in Graph Theory Gary Chartrand, Ping Zhang (2012, Notes by Evan Chen)

#### 3.2 Supplementary

#### 3.2.1 **Proof**

- Book of Proof Richard Hammack (3.3 Edition, 2022)
- ▶ Book of Proof Richard Hammack (3.3 Edition, 2022, Playlist by Jeremy Teitelbaum)
- Book of Proof Richard Hammack (3.3 Edition, 2022, Playlist by Michael Penn)

#### 3.2.2 Graph Theory

- ▶ Introduction to Graph Theory: A Computer Science Perspective Reducible (2020)
- **D**3 Graph Theory (Interactive)
- **Graph Online (Interactive)**
- Graph Theory Don Sheehy (2020)

### 4 Reading Schedule

• FCGT is the abrevviation of A First Course in Graph Theory - Gary Chartrand, Ping Zhang (2012).

**■** FCGT Week 01 Appendix 1: Sets and Logic Appendix 2: Equivalence Relations and Functions Appendix 3: Methods of Proof FCGT Week 02 = Chapter 1: Introduction **FCGT** Week 03-04 Chapter 2: Degrees Chapter 3: Isomorphic Graphs **FCGT** Week 05-06 Chapter 4: Trees Chapter 5: Connectivity **FCGT** Week 07-08 Chapter 6: Traversability Chapter 7: Digraphs **FCGT** Week 09-10 Chapter 8: Matchings and Factorization Chapter 9: Planarity **FCGT** Week 11-12 Chapter 10: Coloring Graphs

## 5 Further Readings (Optional)

If we want to read a more comprehensive book, the following book is great from the same authors.

E Graphs and Digraphs - Gary Chartrand, Heather Jordon, Vincent Vatter, Ping Zhang (7th Edition, 2024)