Complex-Network Modelling and Inference

Lecture 26: Revision

Matthew Roughan
<matthew.roughan@adelaide.edu.au>
https://roughan.info/notes/Network_Modelling/

School of Mathematical Sciences,
University of Adelaide

January 14, 2025

Section 1

Notes

Admin

Consulting Time:

- Monday, October 29th, 2pm.
- Monday, October 5th, 2pm.

Please note I am away Wed 30 Oct - Fri 2 Nov.

Admin

Last year's exam and solutions are available on the web page.

Admin

Exam conditions

1. students are allow 2 double-sided a4 pages of hand-written notes
2. calculators without remote capabilities are allowed

Section 2

Revision

Outline

Intro Topics

1. Introduction and Course Summary
2. A Brief History of Communications Networks
3. Graph notation and representation
4. Application: Bayesian Networks
5. Graph connectivity and traversal
6. Graph features
7. Application: Genome Reconstruction
8. Graph features (2)
9. Random Graphs: Erdos-Renyi random graphs
10. Random Graphs: spatially-embedded random graphs
11. Random Graphs: small world networks
12. Random Graphs: preferential-attachment models
13. Random Graphs: HOT and COLD

Outline

Advanced Topics

1. Modelling with Graphs
2. Operations on graphs (unary operators)
3. Operations on graphs (binary operators)
4. Complex Operations on graphs
5. Shortest paths (Floyd-Warshall algorithm)
6. Path algebras
7. Path-problem algorithms
8. Network Topology Measurement
9. Network Sampling
10. Network Tomography
11. Network Topology Inference
12. Graph Matching

Further reading I