

Report: 16th-27th January, 2017

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Week 1 (16th-20th January,2017):

Revision of my Structured Masters Essay (Laplacian Matrix of a Network and Applications). Focus was mainly on the centrality measures and Laplacian matrix.

Revision Guiding Questions included?

- What is meant by centrality of a node?
- Why is it important to compute the centrality of a node within the network?
- Explain the different centrality measures and their applications in the real-world.
- Any correlation between the different centrality measures? Explanation for results?
- Do you think there exist new determinants of importance of a node that are not addressed within the existing centrality measures?
- Why is it called the Laplacian?
- What is the importance of the Laplacian?
- Explain some of the applications of the Laplacian.
- Can you think of some other applications of the Laplacian?
- How about Laplacian matrix of a directed network? What are its properties? Any applications in real world?

Week 2 (23rd-27th January,2017):

a) Ford-Fulkerson Algorithm (FFA) for flow networks:

- What are flow networks?
- Examples of such networks in real-world
- operation of the Ford-Fulkerson Algorithm for maximum flow
- What is maximum cut in FFA?
- Can we use the Laplacian matrix to compute the maximum cut in a flow network?

b) Consensus in Networks:

- What is consensus?
- Examples of real world scenarios where consensus is applied?
- Application of Laplacian matrices in the analysis of consensus in networks

- Long range interactions- may be grouped under physical or social influences.

Regarding the social influence, using the analogy of finance theory, why is the Future value of information always greater than the present value.

- Can we think of any other kind of influence or method for modelling long range interactions?