

MPhil in Advanced Computer Science

Flows in Networks

Leader: Dr RJ Gibbens
Timing: Lent Term
Prerequisites:
Structure: 14 Lectures + 2 example classes

AIMS

This module aims to provide a understanding of models for flows in networks and to illustrate these ideas by considering road and communication networks.

SYLLABUS (outline only)

1. (2L) Mathematical foundations: unconstrained and constrained optimization and equilibrium concepts
2. (4L) Applications to traffic assignment and road pricing in road transport networks
3. (4L) Applications to computer packet networks including decentralised flow control and network utility maximization
4. (4L) Mathematical foundations: game-theoretic notions of equilibrium, Braess's paradox and the price of anarchy for network problems

OBJECTIVES

On completion of this module students should:

- Have a broad understanding of how optimization and game theory underpin our understanding of diverse resource allocation problems in networks.
- Have a familiarity with models for road and communication networks.

COURSEWORK

Course work will take the form of two example sheets with two associated example classes.

PRACTICAL WORK

There is no practical work.

ASSESSMENT

For each component of the assessment please describe:

- Lectured content.
- How it will be assessed? The lectured content will be assessed by unseen examination.
- Who will set and mark the assessments? The course leader.
- Its weighting toward the final module mark (e.g., 75 %). 100%
- Form of the final module mark, e.g., a percentage (the preferred approach), a letter grade (A excellent, B good, C satisfactory, D fail), pass/fail. Percentage mark.

RECOMMENDED READING

TBD

Last updated: July 2010