Model Building in Operations Research

MA4260

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Objectives and scope. This course is intended to give a global view of Operations Research from the perspective of applications. The emphasis is to illustrate how application problems can be modeled mathematically as optimization problems. The first part of the course introduces basic models essential to model building. The second part is on the formulation of a variety of realistic problems.

The focus of this module is on modelling instead of methods for solving the formulated problems. Students are encouraged to use computers to solve the modelled problems.

Contents

1. Overview
2. Linear, integer linear and nonlinear programming (deterministic and stochastic)
3. Semidefinite and second order cone programming
4. Complementarity and variational inequality problems (static and dynamic)
5. Case Studies.

Assessment (subject to changes at Instructor's discretion).

* 20% on assignments, including tutorial-class performance.

* 20% on one mid-term test (1 hour).

* 60% on the final examination (2.5 hours).

Recommended texts

1. H.P. Williams, *Model Building in Mathematical Programming*, John Wiley, 1999.

2. S.P. Bradley, A.C. Hax an T.L. Magnantee, *Applied Mathematical Programming*, Adison-Wesley, 1977.

3. Dimitris Bertsimas and John Tsitsiklis, *Introduction to Linear Optimization*, Athema Scientific, Belmont, Mass., 1997.

4. R.W. Cottle, J-S. Pang and R.E. Stone, *The Linear Complementarity Problem*, Academic Press, 1992.

5. S. Boyd and and L. Vandenberghe, *Convex Programming,* Cambridge University Press, 2004.

6. M.S. Lobo, L. Vandenberghe, S. Boyd, and H. Lebret, "Applications of second-order cone programming," Linear Algebra and Its Applications, 284:193-228, 1998.

• Books 1-4 are reserved for you in the "RBR" section of Science Library. The first part of this course will be based on Book 1 and Chapter 1 of Book 2. Item 5 and 6 can be found at Professor Lieven Vandenberghe's webpage

http://www.ee.ucla.edu/~vandenbe/publications.html