



GAME THEORY

PROF. K. S. MALLIKARJUNA RAO

Industrial Engineering and Operations Research
IIT Bombay

PRE-REQUISITES : Calculus, Linear Algebra & Probability

INTENDED AUDIENCE : Maths/CS/Econ/EE/Management

COURSE OUTLINE:

Game theory models conflict and cooperation between decision makers who are assumed to be rational. It has applications in multiple disciplines and areas. The aim of this course is to introduce the following topics at a basic level: combinatorial games, zero-sum games, non-zero sum games and cooperative games. Learning outcomes for the course: At the end of the course, the student should be able to • Model and analyse conflicting situations using game theory..

ABOUT INSTRUCTOR :

Prof. K.S. Mallikarjuna Rao, After obtaining his Ph.D from IISc Bengaluru, Prof. K.S. Mallikarjuna Rao has spent few years at Centre de Mathematique et Informatique, Marseille, France; Indian Statistical Institute Delhi, University of Texas at Dallas, USA; and at TIFR Bengaluru as a postdoctoral fellow. He joined IEOR, IIT Bombay in 2007, where he is currently Associate Professor. His research interests include probability, game theory, optimization and stochastic control.

COURSE PLAN :

Week 1: Combinatorial games: Introduction, Examples, Game of Nim

Week 2: Combinatorial games: Impartial games, Hex game, Brouwer Theorem

Week 3,4: Zero-sum games

Week 5,6: Non-zero sum games

Week 7,8: Cooperative games