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Institute for Mathematics and its Applications
2011 Seminar Series: 11
University of Wollongong

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Title: On Singularly Perturbed Linear Programming and Optimal Control Problems

Speaker: Professor Vladimir Gaitsgory (University of South Australia)

Time and Date: 11:30am, Friday, September 23, 2011

Location: Room 15.206

Abstract: Some optimization problems are characterized by the fact that their optimal values may change abruptly with small changes of data (due to an abrupt change of feasible domains). One of the way of investigating these phenomena is to study families of problems depending on a parameter in such a way that the optimal values obtained with small positive values of the parameter are significantly different from those obtained with the zero value of the parameter (that is, the dependences of the optimal values on the parameter are discontinuous at zero). Such families of optimisation problems are called singularly perturbed (SP).

In our presentation, we will first discuss results related to SP linear programming (LP) problems and then turn to a consideration of SP optimal control problems, the latter will be shown to be equivalent to certain infinite dimensional LP problems.

In both cases, our main focus will be on the construction of the true limit problems, the solution of which can be used for construction of near optimal solutions of the SP problems with small but nonzero values of the parameter. Theoretical results will be illustrated with numerical examples.

Biography: Vlad was awarded his PhD in Applied Mathematics by the USSR Academy of Science and has worked at the University of South Australia since 1993. His research interests include: control, optimisation, dynamical systems and game theories. His research includes applications to electrical and mechanical engineering, environmental modelling, manufacturing systems and mathematical economics. He has received ARC funding continuously since 1997 and is currently serving on the Engineering, Mathematics and Informatics panel of the ARC College of Experts. He has published over 60 papers and has over 250 citations on ISI.