

Richard Vinter (r.vinter@ic.ac.uk), Department of Electrical and Electronic Engineering, Imperial College, London, UK, *Differential Games and Controller Design: A Case Study in Process Control*

This presentation concerns a class of dynamic optimization problems, which we term exit problems, where the object is to contain the state in an allowed region for as long as possible, in the presence of disturbances. The theory relating to such problems has widespread applications. Exit from the allowable region represents, for example, the saturation of a communication channel, loss of ‘lock’ in a radio communications link or, in process control, an undesirable change of phase, overflow, etc.. We review various formulations of exit problems that have been proposed, notably stochastic and game theoretic formulations, and inter-relate them. Special attention is given to a design problem in process control. It is argued that approaching this design problem as an example of an exit problem takes account of disturbances in a very natural way and offers improvements over other approaches. An explicit solution to this problem is given. This example is of interest, partly because it provides a new design tool in process control, but also because of the insights it gives in the kinds of pathologies that the general theory must address.