The Center for Control, Dynamical Systems, and Computation
University of California at Santa Barbara
Fall 2008 Seminar Series
Presents

Solution of a distributed linear system stabilisation problem

Brian Anderson
Australian National University

Thursday, October 2, 2008 1:00-2:00pm ESB 1001

Abstract:
This talk deals with the problem of how to construct decentralized feedback control laws used by agents in a two-dimensional formation, where the shape of the formation is to be preserved through a sufficient number of agent pairs each maintaining a prescribed separation, and the open-loop system may be unstable. Only one agent of an agent pair is responsible for the maintenance of the separation, the other agent being unconscious of that control objective. A linearized or small signal version of the problem comes down to an unusual linear systems problem. Given a real square matrix A, when is there a real diagonal matrix Λ such that ΛA has all its eigenvalues with negative real part, and how may such a matrix be constructed? The diagonal matrix Λ in effect constitutes a set of controller gains.

A sufficient condition (which in a sense is not 'far' from a necessary condition) is obtained, involving the principal minors of A, and it is fulfilled in the application problem. Some associated open problems are also exposed.

About the Speaker:
Professor Anderson has Published 10 books and over 800 papers. He holds honorary degrees from Catholic University of Louvain in Belgium, the Swiss Federal Institute of Technology, and the Universities of Sydney, Melbourne, New South Wales and Newcastle. Prof. Anderson is a Fellow of IEEE, the National Academy, London Royal Society, International Federation for Automatic Control, and three Australian Academies. He is also a former President of the Australian Academy of Science, Australian Foundation for Science, and International Federation for Automatic Control. He is a member of the Australian Science and Technology Council and the Prime Minister's Science, Engineering and Innovation Council.