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HAROLD J GAY LECTURE SERIES

PDEs and Fractals • Geometry with its applications has been at the heart of the development of partial differential equations and boundary value problems since the very beginning. In physics, biology, economics, and other applied fields, a variety of new problems are now emerging that display unusual geometrical, analytical and scaling features, possibly of fractal type. The objective of these lectures is to acquire the view of outstanding mathematicians on the subject of differential equations and fractals, and their developments and applications, in a broad perspective encompassing both classical highlights and contemporary trends.

Wendell H. Fleming

Professor Emeritus, Division of Applied Mathematics, Brown University

Recipient, Isaacs Award, International Society for Dynamic Games, 2006

Differential Games and Risk Sensitive Stochastic Control

Friday, November 6, 2015
4:00pm, Salisbury Labs 104

ABSTRACT The first part of this lecture gives a concise historical overview of two-player, zero sum differential games, beginning with the pioneering work of Isaacs. The Crandall-Lions theory of viscosity solutions for nonlinear partial differential equations has a crucial role in the treatment of value functions for differential games. • Differential games provide a convenient link between deterministic and stochastic approaches to control systems. A second part of the lecture concerns ideas of risk sensitivity, large deviations for small random perturbations of dynamical systems and stochastic control. As a measure of risk aversion tends to infinity, a differential game is obtained as the limit of corresponding risk sensitive stochastic control problems. This game can be interpreted as a kind of "max-plus" stochastic control problem, in which the usual operations of addition and multiplication are replaced by their max-plus counterparts. • An example from mathematical finance is given to illustrate these methods.

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Refreshments available before the lecture. Participation of faculty and students is most welcome

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Poster Organization: Rhonda Podell