Viernes, 30 de Enero

Dinámica Electrónica en Superredes Semiconductoras

Álvaro Perales Eceiza

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Abstract

Tras una breve introducción a las superredes semiconductoras y a los mecanismos de transporte de carga más relevantes, se tratará el transporte mediante túnel resonante secuencial, utilizando un modelo discreto de convección-difusión, y estudiando las bifurcaciones en el espectro de soluciones. A continuación se introduce un retardo temporal en las ecuaciones para simular el tiempo de paso túnel de los electrones a través de las las barreras. Por último se analizará el transporte por minibanda mediante la derivación de un nuevo modelo continuo de convección-difusión a partir de un sistema semiclásico de Boltzmann-Poisson. En todos los casos se comparan los resultados obtenidos con experimentos.

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Viernes, 13 de Febrero

On the stochastic geometry of birth and growth processes. Applications to polymer crystallization

Prof. Vincenzo Capasso

MIRIAM & Dipartimento di Matematica. Università degli Studi di Milano

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Viernes, 27 de Febrero

Simulation and Optimization of complex processes

Sebastian Sager

WR Heidelberg

Abstract

The talk will be divided in two parts. The first part will give an overview over some institutions at Heidelberg University: the Interdisciplinary Center of Scientific Computing, the graduate program "Complex Processes: Modeling, Simulation and Optimization" and especially on the workgroup "Simulation and Optimization". The second part will focus on my personal Ph.D. project, which is "Numerical methods for mixed-integer dynamic optimization". It will contain a general introduction to optimal control and extensions in the case of integer (binary) variables. Furthermore some applications, e.g. a distillation column with valves, will be presented.

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Jueves, 25 de Marzo

Stabilization of traveling waves in a forced reaction-diffusion equation

Prof. Evgueni Zemskov

Abstract

A piecewise linear reaction-diffusion equation is considered under external forcing. Exact analytical solutions for the traveling fronts and pulses are obtained. In the presence of forcing there exists a set of solutions with different phases. The corresponding velocity equations are derived and the conditions for stationary waves are investigated. Pulse waves are treated in some detail. A linear stability analysis of pulse solutions is performed and the growth rate equation is obtained. To illustrate the specific features of the wave behaviour the simplest form of the periodic force of cosine type was used. There are two types of stationary pulses with symmetric and asymmetric parameter sets in the phase-amplitude diagram. The pulses with symmetric set is always unstable whereas the pulses with asymmetric set may be stable.