Seminario
Matemática Aplicada - UCM

JORNADA INAUGURAL DEL CURSO ACADÉMICO 2010-2011
Martes 5 de octubre de 2010
Facultad de CC. Matemáticas. Sala 209. Seminario Alberto Dou

Programa

11:00 h. Masayasu Mimura, (Meiji University). **Modelling of smoldering combustion in microgravity.**
(Con la colaboración del Instituto de Matemática Interdisciplinar, del Grupo de Investigación Modelos Matemáticos en Ciencias de la Naturaleza y del Proyecto Europeo ITN "FIRST).

ABSTRACT
In this lecture I propose a mathematical model for the slow and partial combustion (smoldering) process of a sheet of paper ignited on one side and in the presence of a flow of air confined in a narrow gap above the paper. The model, which is described by a reaction-diffusion system, induces mass and thermal balance for the various components. After having introduced some simplifications, a suitable rescaling is performed. We show that the model generates various complex patterns, depending on the air flow velocity. In particular, two cases of travelling wave solutions are analysed, corresponding to the opposite cases of a sufficiently large or a moderate air flow.

12:00 h. Pausa. Café.

12:30 h. Giuseppe Buttazzo, (Università di Pisa). **Optimal Dirichlet Regions for Elliptic Problems.**
(Con la colaboración de la Revista Matemática Complutense y del Grupo de Investigación "Comportamiento Asintótico y Dinámica de Ecuaciones Diferenciales- CADEDIF").

ABSTRACT
We consider an elliptic problem in a given domain and a given right hand side f. The Dirichlet region is the unknown of the problem and has to be chosen in an optimal way, in order to minimize a cost functional, and in a class of admissible choices. The cost we consider is the compliance functional and the class of admissible choices consists either of all sets of N points, or of all one-dimensional connected sets (networks) of a given length L. Then we let N (respectively L) tend to infinity and look for the Γ-limit of suitably rescaled functionals, in order to identify the asymptotical distribution of the optimal Dirichlet regions. The asymptotically optimal shapes are discussed as well and links with average distance problems are provided.