

SPECIAL JOINT EVENT

NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATIONS SEMINAR

AND

PHYSICAL MATHEMATICS SEMINAR

Shape Optimization for Tumor Location

CRISTINA TURNER

University of Cordoba, Argentina

ABSTRACT:

In non-invasive thermal diagnostics, accurate correlations between the thermal image at skin surface and interior human physiology are desired. In this work an estimation methodology to determine unknown geometrical parameters of an embedded tumor is proposed. We defined a functional that represents the mismatch between a measured experimental temperature profile, which may be obtained by infrared thermography on the skin surface, and the solution of an appropriate boundary problem. This functional is related to the geometrical parameters through the solution of the boundary problem, in such a way that finding the minimum of this functional form also means finding the unknown geometrical parameters of the embedded tumor. Sensitivity analysis techniques coupled with the adjoint method were considered to compute the shape derivative of the functional and a nonmonotone spectral projected gradient method was implemented to solve the optimization problem of finding the optimal geometric parameters.

THURSDAY, FEBRUARY 2, 2012

2:30 PM

Building 2, Room 143

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