UNIVERSITY OF CALIFORNIA RIVERSIDE

DEPARTMENT OF MATHEMATICS

COLLOQUIUM

Dr. Chiu-Yen Kao

(Ohio State University / Claremont McKenna College)

"An efficient rearrangement algorithm for shape optimization problem involving principal eigenvalue in population dynamics"

Abstract:

In this talk, an efficient rearrangement algorithm is introduced to the minimization of the positive principal eigenvalue under the constraint that the absolute value of the weight is bounded and the total weight is a fixed negative constant. Biologically, this minimization problem is motivated by the question of determining the optimal spatial arrangement of favorable and unfavorable regions for a species to survive. The method proposed is based on Rayleigh quotient formulation of eigenvalues and rearrangement algorithms which can handle topology changes automatically. Using the efficient rearrangement strategy, the new proposed method is more efficient than classical level set approaches based on shape and/or topological derivatives. The optimal results are explored theoretically and numerically under different geometries and boundary conditions.

Tuesday, April 24th, 2012

Surge 284

4:10-5:00pm

Tea Time at 3:40pm