Department of Applied and Computational Mathematics and Statistics Colloquium

Bogdan Kazmierczak

Institute of Fundamental Technological Research
Polish Academy of Sciences

will give a lecture entitled:

Spatially extended models of kinase – receptor interaction

Abstract

We perform a mathematical analysis of a spatially-extended model describing mutual phosphorylation of cytosolic kinases and membrane receptors in immune cells. From the mathematical viewpoint the considered system is interesting because it couples differential equations defined in a domain and on its boundary via nonlinear Robin boundary conditions. We examine the conditions necessary for stable activation of the cell.
To analyze a spherically-symmetric case, we consider an auxiliary problem in which the Robin boundary condition on the external boundary of the spherical shell is replaced by a uniform Dirichlet boundary condition. This method allows us to find the stationary spherically-symmetric solutions, both stable and unstable. Interestingly, numerical computations suggest also the existence of non-spherically symmetric unstable stationary solutions to the spherically-symmetric problem. These conjectured solutions appear to lie between super– and subsolutions that converge in time to two different stable spherically-symmetric steady states.

Monday, August 19, 2013
4:00 p.m. to 5:00 p.m.
127 Hayes-Healy Center

Colloquium Tea **3:30 p.m. to 4:00 p.m.** **154 Hurley Hall**