



## Lecture's Outlines – Prof. Anasatasios XEPAPADEAS

LECTURE 1 AND LECTURE 2:

### OPTIMAL MANAGEMENT OF SPATIAL ECONOMIC/ECOLOGICAL MODELS

The lecture will cover the following topics:

1. Modelling spatial diffusion and systems of reaction-diffusion equations
2. Economic/ecological systems and resource diffusion
3. Emergence of pattern formation in reaction-diffusion systems of resource management through the Turing mechanism
4. Optimal control of partial differential equations with application to the optimal control of resources under diffusion
5. Emergence of pattern formation in the optimal control reaction-diffusion systems of resource management through the mechanism of optimal diffusion-induced instability
6. Issues of regulation in reaction-diffusion economic/ecological systems

Reading material relevant to the lecture:

Brock, W. and A. Xepapadeas, "Spatial Analysis in Descriptive Models of Renewable Resource Management," *Swiss Journal of Economics and Statistics*, Vol. 141, September 2005, 331-354.

Brock, W. and A. Xepapadeas, "Diffusion-Induced Instability and Pattern Formation in Infinite Horizon Recursive Optimal Control," *Journal of Economic Dynamics and Control*, forthcoming.

Murray, J., *Mathematical Biology*, Third Edition, Berlin: Springer, 2003.

Okubo, A. and Levin, S., Eds. (2001), *Diffusion and Ecological Problems: Modern Perspectives*, 2nd Edition, Berlin: Springer, 2001.