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Graduate students
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Registration dates:
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Registration fee:
450 Euros (including accommodation)
Upon special agreement with an applicant's university the Program Committee can provide a fellowship to compensate for the applicant's registration fee

Meals/transportation:
Paid by participant

Contact: Dr. Elena Rovenskaya erovenskaya@cs.msu.su

EGMD PROGRAM

• four lectures on modern mathematical approaches to assessment of economic growth
• round table discussions and training
• introductory lecture

EGMD working language: English

Daily plan:

• four academic hours of lectures
• four academic hours of discussions and training

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Winter School
at Moscow State University

EGMD
Moscow 2011

Economic Growth:
Mathematical Dimensions

30 January – 6 February 2011

Presidium, Russian Academy of Sciences
Moscow, Russia

Lomonosov Moscow State University
Moscow, Russia

Steklov Mathematical Institute,
Russian Academy of Sciences, Moscow, Russia

International Institute for Applied Systems Analysis
Laxenburg, Austria

Corresponding Member of the Russian Academy of Sciences **Sergey Aseev**
Steklov Mathematical Institute, Russia

Application of Pontryagin's Maximim Principle in Growth Theory

Infinite-horizon optimal control problems arise naturally in studies of economic growth processes. Typically the Pontryagin maximum principle plays a role of the main tool. The aim of the course is to provide an introduction in the theory of the Pontryagin maximum principle with a focus on the methodology of its application in growth theory. The recently developed "finite-horizon approximation" approach to deriving a modified maximum principle targeted specifically to infinite-horizon problems of optimal control is presented. The attention is focused on the characterization of the behavior of Pontryagin's adjoint variables (also treated as "shadow prices") in a neighborhood of infinity. The developed methodology is illustrated by meaningful examples from growth theory

Professor **Brian Fath**
Towson University, USA

Economic Dynamics of the Complex System Cycle

The objective in this lecture is to introduce the students to the complex system cycle and how economic dynamics are similar to ecological dynamics making a case for similar modelling approaches in assessment of integrated socio-ecological systems. Complexity methods include *agent based modelling, spatial and hierarchical modelling, self-organized criticality, and evolutionary game theory,* to name a few. Economic applications include simulating artificial stock markets and other phenomena in which bounded rationality replaces rational expectations.

Professor **Gerhard Sorger**
University of Vienna, Austria

Rationalizability in Optimal Growth Theory

The lecture will proceed along the following lines:
1. The reduced-form optimal growth model: In this part the model will be formulated, examples of its applications will be given, and it will be shown how it can be solved by means of dynamic programming methods. 2. The inverse optimal growth model: In this part the rationalizability problem is explained, two approaches how it can be solved are presented, and these approaches by means of examples are illustrated. 3. Discount factor restrictions: In this part some results are presented that demonstrate that a high rate of time-preference is necessary for the emergence of complicated dynamics in the reduced-form optimal growth problem.

Professor **Thomas Weber**
Stanford University, USA

Dynamic Games and Economic Growth

We introduce the basic theory of differential games in view of analyzing models related to economic growth involving several agents. Of particular interest are applications to capital accumulation, environmental pollution, and resource extraction. We also discuss welfare implications of institutional design shaping the nature of the agents' interactions.