

# ZEW Expertenseminar

## Simulation Methods in Dynamic Macroeconomics

Recursive methods and their numerical application have become the most important solution methods in modern macroeconomics. The areas of their application today encompass almost all areas of macroeconomics: Growth theory, monetary economics, social insurance, fiscal policy etc. Despite their widespread use in research, they have not yet become part of the standard curriculum at European economic faculties. The course aims at closing this gap in graduate teaching. The seminar will teach both theory and simulation of recursive methods. The programmes are implemented in MATLAB.

### Target Group

Ph. D. students and postgraduates in macroeconomics as well as researchers in the financial sector

### Seminar Benefits

Researcher broaden their methodological expertise and improve programming skills  
Presentation of current methodological research results

### Seminar Fee

The seminar fee is EUR 750,- (plus VAT):

**Tutors** Dr. Tim Mennel, ZEW

Dr. Marcus Hagedorn, Frankfurt University

### Monday, April 23, 2007

#### Numerical Basis

- 09:00 - 09:15 Welcome and outline of the course
- 09:15 - 10:45 ■ **Numerical Optimization:**  
Mathematical foundation, optimization algorithms in one and higher dimensions, Newton- and Quasi-Newton algorithms, economic applications
- 11:00 - 12:00 ■ **Programming Workshop: Optimization**
- 13:00 - 14:30 ■ **Solving Non-Linear Equations:**  
Mathematical foundation, linear equation solvers, Newton-Algorithm, Gauss-Jacobi and Gauss-Seidel algorithms, economic applications
- 14:45 - 16:00 ■ **Programming Workshop:**  
Non-Linear Equations
- 16:00 - 17:30 ■ **Discussion of workshop results**

### Tuesday, April 24, 2007

#### Approximation and Theory of Dynamics

- 09:00 - 10:30 ■ **Approximation:**  
Mathematical foundation, log-linearization, polynomial interpolation, approximation with orthogonal polynomials, spline-interpolation, multidimensional approximation
- 10:45 - 12:00 ■ **Programming Workshop:**  
Approximation
- 13:00 - 14:30 ■ **Theorie of Dynamics:**  
Deterministic sequence problems, stochastic sequence problems, functional equations, contraction mapping theorem, Bellman equation, envelop theorem, Euler equation, economic applications
- 14:45 - 16:00 ■ **Theorie Workshop:**  
Theory of Dynamics
- 16:00 - 17:30 ■ **Discussion of workshop results**

### Wednesday, April 25, 2007

#### Simulation of Dynamic Models

- 09:00 - 10:30 ■ **Simulation with the Bellman equation:**  
Numerical fix-point iteration, discrete version of Bellman equation, polynomial approximation of value and policy functions, linear regulator problem, economic applications
- 10:45 - 12:00 ■ **Programming Workshop:**  
Bellman equation
- 13:00 - 14:30 ■ **Simulation with the Euler equation:**  
Explicit formulation of the dynamics, theory of projection methods, least square, collocation and Galerkin method, parameterized expectation approach, economic applications
- 14:45 - 16:00 ■ **Programming Workshop:**  
Euler equation
- 16:00 - 17:30 ■ **Discussion of workshop results**

## Seminar Fee

The seminar fee is EUR 750,- (plus VAT). The seminar fee includes refreshments as well as lunch on all complete seminar days. Teaching materials are also included in the price.

## Discount System

If several persons of an institution book the same seminar, ZEW will grant a discount of 10% on the regular seminar fee for the second and each subsequent participant. A single participant who simultaneously books more than one seminar will receive a discount of 10% on the regular fee for the second and each subsequent seminar. These discounts do not apply to half-day seminars. Members of universities, universities of applied sciences (Fachhochschulen) and non-university research institutes (Leibniz Gemeinschaft) as well as employees of federal and state ministries or agencies from Germany receive a discount of 30% on the seminar fees. Please note that these individual discounts are not cumulative.

## Organisation of the seminar

In case of questions concerning the organisation of the seminar please contact:

Vera Pauli

Telephone: 0049 (0)621/1235-240,

Fax: 0049 (0)621/1235-224

E-mail: pauli@zew.de

## Terms and Conditions

Please send this form as a fax to the following number: +49(0)621/123-224. You can also register via internet ([www.zew.de/professionaltraining.de](http://www.zew.de/professionaltraining.de)). Once an application is received, it is considered binding.

In the event of cancellation 14 days or less before the start of the seminar, the full participation fee applies. For cancellations before this deadline, we charge an administrative fee of EUR 50 plus 7% VAT (as of Aug 1, 2006). Cancellation must be submitted in written form. If you are unable to attend in person, another person may take part on your behalf.

The ZEW reserves the right to cancel the seminar in the case of certain unexpected events, for example illness of the lecturer or insufficient number of participants. In this event any fees paid will be refunded.

## Hotel

If you need accommodation please contact Vera Pauli.

# ZEW

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To participate please fill out the following form and send it to +49(0)621/1235-224

## Simulation Methods in Dynamic Macroeconomics

April 23-25, 2007, ZEW, Mannheim

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Date, Signature

(With your signature you accept the terms and conditions of the ZEW)