



Lectures on Numerical Mathematics and Applications

Zaragoza, 3-4 June, 2013

The first courses of the series "Lectures on Numerical Mathematics and Applications" will take place at the University of Zaragoza (Spain) from 3rd to 4th June 2013. The courses are addressed mainly to newly-graduated, PhD students and professionals from engineering schools and applied science Universities from all over the world. The main aim of the courses is to introduce young researchers to the modeling and simulation of different problems of partial differential equations.



ALFIO BORZI - Multigrid methods for optimal control problems with PDE constraints
Introduction to advanced multigrid strategies for solving unconstrained and constrained PDE control problems. Development of multilevel algorithms for optimal control and optimization. In particular, multigrid schemes for linear and nonlinear elliptic optimality systems and the MGOPT approach to unconstrained optimization problems are discussed.



C.W. OOSTERLEE - Numerical Mathematics Techniques in Computational Finance
The lectures on computational finance introduce the derivation of the famous Black-Scholes partial differential equation for the pricing of an option. We will explain aspects of financial markets and products. In particular, we explain what a financial option is, and how we can price it with applied mathematics techniques.



ULRICH RÜDE - Introduction to Parallel Scientific Computing
Overview of parallel systems and high performance computing paradigms for scientific applications. In particular, the lecture will discuss parallel iterative methods and parallel multigrid algorithms. This will include techniques of performance optimization and scalability studies on current supercomputer architectures.

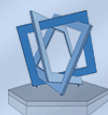


VOLKER SCHULZ - Introduction to shape optimization
Introduction of basic aspects of the classical shape calculus leading to the famous Hadamard formulas for volume and boundary objectives. Numerical treatment of shape optimization problems within a PDE context. Discussion on a Riemannian framework for the optimization on shape spaces is provided.



IRAD YAVNEH - Introduction to multiscale computational methods with applications to image processing
Exposition of multiscale computational methods. Introduction of the basic concepts underlying these methods, and the difficulties encountered in the development of algorithms based on these ideas. Discussion of several specific problems in the field of image processing and the multiscale algorithms that have been developed for their solution.

More Info: www.iuma.unizar.es/-lnma/ / Lectures_NMA@unizar.es



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