

**UNIVERSITÄT DES SAARLANDES**  
**Fakultät 6.1 Mathematik**

Lehrstuhl: Univ.-Prof. Dr. Dr. h. c. mult. A.K. Louis  
Dr. rer. nat. A. Lakhali  
lakhali@num.uni-sb.de  
<http://www.num.uni-sb.de/>



**Lecture: "Parameteridentifikation / Parameter Identification"**

- **Time and Place:** Thursday 2-4 PM, Room: Hörsaal IV, Building: E2. 4.
- **Language:** This lecture will be given in **English or German** depending on the audience.
- **Synopsis:** The goal of this lecture is to provide an overview of important deterministic and statistical techniques for the analysis, regularization, and numerical computation of solution for parameter identification problems. These problems are involved in a large variety of natural, industrial, biomedical, economical and social phenomena which are modeled by (systems of) partial differential or or integral equations. Parameter identification deals with the reconstruction of unknown parameters given as coefficients, source terms, boundary values. Identifiability, stability and non-linearity are typical features of parameter identification problems. We discuss these issues based on practically relevant examples from biomedical imaging, non destructive testing and calibration of financial models.
- **Background:** The material will be introduced gradually, so that calculus and linear algebra would be sufficient as a minimal background required for this lecture.
- **Target Group:** This lecture is attended to both bachelor and master students, in mathematics computer sciences or engineering.
- **References:**
  1. Deuffhard, P.: Newton Methods for Nonlinear Problems, Springer 2004
  2. Engl H. W., M. Hanke M. and Neubauer A., Regularization of Inverse Problems Kluwer, Dordrecht, 1996.
  3. Isakov V., Inverse Problems in Partial Differential Equations, Springer, New York, 1998.
  4. Kaltenbacher B., Neubauer A., Scherzer O.: Iterative Regularization Methods for Nonlinear Ill-Posed Problems, de Gruyter, 2008.
  5. Klivanov M. V. and Beilina L.: Approximate Global Convergence and Adaptivity for Coefficient Inverse Problems, Springer 2012