

# Summer School and Workshop GRAZ 2007

## Course Outline

### PARAMETER ESTIMATION TECHNIQUES AND MODEL VALIDATION

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- 1) Parameter Estimation in General
  - Basic concepts and examples
- 2) An Overview of Probability and Statistics
- 3) Sensitivity Identifiability
- 4) Nonlinear Least Squares Estimation
  - Gauss-Newton method
  - Subset selection and reduced-order estimation
  - Sampling optimization algorithms
- 5) Kalman Filter Based Estimation

#### References:

- [1] Y. Bard, *Nonlinear Parameter Estimation*, Academic Press, 1974.
- [2] M. Burth, G. C. Verghese, M. Velez-Reyes, "Subset selection for improved parameter estimation in on-line identification of a synchronous generator", *IEEE Trans. On Power Systems*, Vol. 14, No. 1, 218-225, 1999.
- [3] F. L. Lewis, *Optimal Estimation with an Introduction to Stochastic Control Theory*, John Wiley & Sons, 1986.
- [4] P. S. Maybeck, *Stochastic Models, Estimation, and Control: Volume 1*, Academic Press, 1979.
- [5] J. G. Reid, "Structural identifiability in linear time-invariant systems", *IEEE Trans. AC*, Vol. 22, 242-246, 1977.