Institute of Geonics, Czech Academy of Sciences

Department of applied mathematics and computer science & IT4Innovations

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INVITATION TO THE LECTURE

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MARKOV CHAIN MONTE CARLO METHODS IN BAYESIAN INVERSION

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While solving inverse problems from engineering practice, only noisy measured data are typically available. To describe the unknown parameters, it is appropriate to use Bayesian methods that provide a probability distribution of unknown parameters (called posterior distribution). Markov chain Monte Carlo (MCMC) methods are commonly used for the numerical realization of Bayesian inversion; specifically, for generating samples from the posterior distribution. However, in cases when the problem is described by a complex mathematical model, the use of standard MCMC methods is computationally very demanding. The main topic of the talk is the description of ways to increase the efficiency of MCMC methods, from both a theoretical and practical point of view. The efficiency is increased using surrogate models and parallel implementation. Presented methods are applied to inverse problems from the field of geosciences.