

# Fast Stochastic Algorithms for Computations with Uncertainty

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The importance of uncertainty quantification (UQ) has been recognized by the computational sciences society. And UQ has become an essential component in conducting simulations that can predict true physical phenomenon with higher degree of confidence. In recent years many efforts have been devoted to the mathematical and numerical aspects of UQ, with most adopting probabilistic framework. As a result, novel stochastic methods have been developed, with particular emphasis on their applicability to large scale systems.

In this talk we will discuss some of the most widely used numerical strategies for stochastic computations, with a focus on fast numerical algorithms that can efficiently deal with large scale complex systems with uncertain inputs such as parameter values, initial/boundary conditions, material properties, etc. We will also discuss the problem of addressing uncertainty induced by the deficiency of mathematical/numerical models.