

## **Multilevel Monte Carlo for a stochastic optimal control problem**

Qi Sun

We consider the application of multi-level Monte Carlo method to an elliptic optimal control problem with uncertain coefficients. Sample size formulae at each level of MLMC were derived from an optimization perspective, by minimizing the computational error/cost subject to a given computational cost/accuracy. A gradient-based optimization algorithm using MLMC was proposed and compared to the results obtained by classical Monte Carlo method. The computational results show the effectiveness MLMC for obtaining accurate optimal solutions that are needed to construct statistical moments associated with the quantity of interest (QoI) of the stochastic control problem at low cost.