

A stochastic variational multiscale method for diffusion in heterogeneous random media

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A stochastic variational multiscale method with explicit subgrid modeling is provided for solution of stochastic elliptic equations that arise while modeling diffusion in heterogeneous random media [1]. The exact solution of the governing equations is split into two components: a coarse-scale solution and a subgrid solution. A localized computational model for the subgrid solution is derived. The coarse-scale solution is then obtained by solving a modified coarse formulation that takes into account the subgrid model. The generalized polynomial chaos method combined with the FEM is used for the solution of equations resulting from the coarse formulation and subgrid models. Numerical examples are considered for evaluating the method.

References

1. B.V. Asokan, N. Zabaras, A stochastic variational multiscale method for diffusion in heterogeneous random media, *J. Comput. Physics*, in press.