

COLLOQUIUM

The Variational Multiscale Method in Large Eddy Simulation, Reduced Order Models, and Uncertainty Quantification

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The variational multiscale method provides a framework for developing coarse-grained approximations to variational problems. In this approach the trial solution and weighting function spaces are decomposed into resolved and unresolved subspaces. This leads to two coupled variational problems: one for the resolved scales and another for the unresolved scales. The unresolved scales are solved for approximately (and inexpensively) in terms of the residual of the resolved scales, and the result is substituted into the problem for the resolved scales. In this way coarse-grained models that account for the effect of missing scales are generated.

After introducing these ideas, I will discuss their application in developing large eddy simulation models (LES) for turbulent flows, reduced-order models (ROM) for linear algebraic systems and coarse-grained variational methods for solving partial differential equations with stochastic parameters in uncertainty quantification (UQ).

The lecture will take place in Thackeray 704 at 3:30pm.
Refreshments will start at 3:00pm.