Department of Mathematics

University of Houston

Scientific Computing Seminar

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Numerical methods for nonlocal models: asymptotically compatible schemes and multiscale modeling

Monday, March 21, 2022
3 PM- 3:45 PM
Zoom Online Talk
(Room 646 PGH)

Abstract: Nonlocal continuum models are in general integro-differential equations in place of the conventional partial differential equations. While nonlocal models show their effectiveness in modeling a number of anomalous and singular processes in physics and material sciences, for example, the peridynamics model of fracture mechanics, they also come with increased difficulty in computation with nonlocality involved. In this talk, we will give a review of the asymptotically compatible schemes for nonlocal models with a parameter dependence. Such numerical schemes are robust under the change of the nonlocal length parameter and are suitable for multiscale simulations where nonlocal and local models are coupled. We will discuss finite difference, finite element and collocation methods for nonlocal models as well as the related open questions for each type of the numerical methods.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.