



PIMS / AMI Seminar

Wednesday, April 19, 2017

11:00 a.m.

CAB 572



“Efficient Methods for Homogenization of Random Heterogeneous Materials”

Professor Yufeng Nie
Department of Applied Mathematics
Northwestern Polytechnical University
Xi'an, PR China

Abstract

Predicting homogeneous coefficients of random heterogeneous materials involves solving auxiliary problems in volume elements. The accuracy of homogeneous coefficients depends not only on the size of the volume elements, but also on the boundary conditions. Dirichlet and Neumann boundary conditions provide the upper and lower bounds of real homogeneous coefficients, respectively. However, when the contrast ratio of large and small coefficients is high, these upper and lower bounds will be too broad to predict the homogeneous coefficients. In this talk, we propose a new boundary condition constructed by combining the Dirichlet and Neumann boundary conditions ----- Robin boundary condition. As the size of the volume element approaching to infinity, the convergence of the approximate homogeneous coefficients under the Robin boundary condition is shown. Numerical examples demonstrate that the results lie in that of the Dirichlet and Neumann boundary conditions. By choosing proper parameters, the Robin boundary condition performs better than the Dirichlet-Neumann mixed boundary condition and it may be considered as an optimal boundary condition.

Refreshments will be served in CAB 649 at 10:30 a.m.