THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

Monte Carlo Computation of Multiple Extremal Eigenvalues: Algorithms, Results, and Issues

by

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Date: May 6, 2011 (Friday)
Time: 3:30 - 4:30 p.m.
Place: L2, Science Centre, CUHK

(Light refreshments will be served 20 minutes prior to the colloquium.)

ALL INTERESTED ARE WELCOME
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Abstract

I will discuss a novel extension of the power iteration method that allows for the simultaneous computation of multiple extremal eigenvalues of ultra-dimensional matrices and continuous operators. The method works both deterministically and stochastically. The stochastic implementation uses random walkers assigned multiple sets of weights of which at least one set must be a mixture of positive and negative signs. Properly sampling from a distribution of mixed signs is the principal challenge in new method's stochastic use. I will discuss several ways we solved this problem and present results for both deterministic and stochastic applications of the method to discrete and continuous benchmark problems drawn from applied mathematics, statistical mechanics, and nuclear engineering. Time permitting, a brief discussion about issues associated with on-going work concerned with applying these methods to several quantum mechanical problems will be also be given.

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