The University of Chicago

Departments of Computer Science,
Mathematics, and Statistics

Scientific and Statistical Computing Seminar

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The Gaussian Wave Packet Transform: Efficient Computation of the Semi-Classical Limit of the Schroedinger Equation

TUESDAY, January 10, 2012, at 3:30 PM

207 Eckhart Hall, 5734 S. University Avenue.

ABSTRACT

An efficient method for simulating the propagation of a localized solution of the Schroedinger equation near the semiclassical limit is presented. The method is based on a time dependent transformation of the independent variables, closely related to Gaussian wave packets and yields a Schroedinger type equation that is very ammenable to numerical solution in the semi-classical limit. The wavefunction can be reconstructed from the transformed wavefunction whereas expectation values can easily be evaluated directly from the transformed wavefunction. The number of grid points needed per degree of freedom is small enough that computations in dimensions of up to 5 or 6 are feasible without the use of any basis thinning procedures. This is joint work with Giovanni Russo.

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