"Mathematical Analysis of The MCTDHF method"

Claude Bardos
Laboratoire jacques Louis Lions and University of Paris 7

Abstract...

The MultiConfiguration Time Dependent Method is a construction for the approximation of the wave function of N particles with quantum binary interactions. It uses combinations of Slater determinants and therefore leads to a system of non linear Schrodinger equations in R^3 instead of R^{3N}. The stability of the approximation depends on a full rank hypothesis on a global density matrix. Therefore I intend to give a mathematical analysis of the method and to provide sufficient conditions which imply the full rank (or the invertibility) of the density matrix.