

Mean Field report

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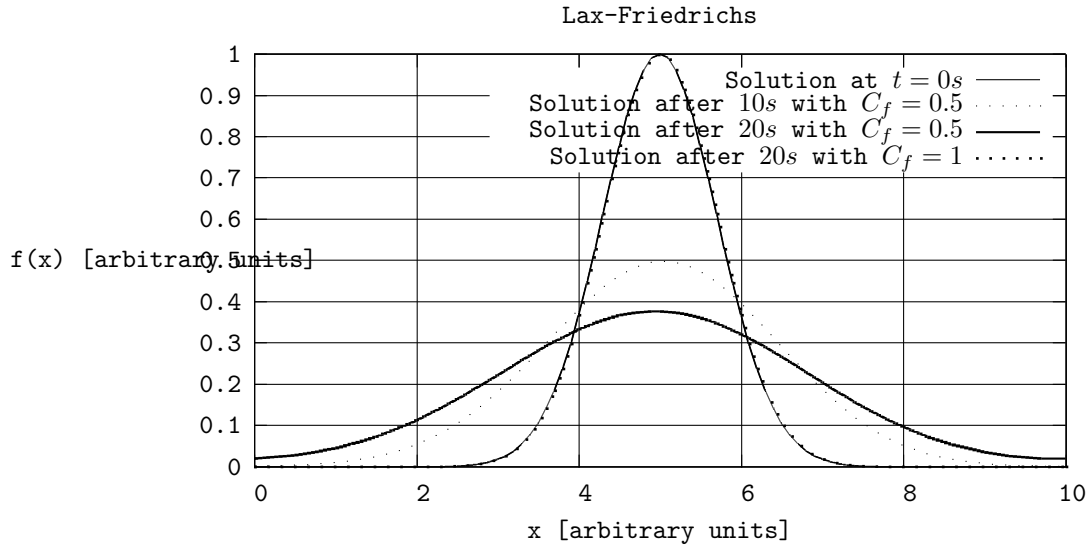
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Abstract

In this report we go over a few methods to solve many-body problems in the mean field approach.

1 Systems of N interacting bosons.

interacting bosons



1.1 Harmonically trapped BEC (δ interaction case).

We want to apply the method just seen to a system composed of N δ interacting bosons trapped in a harmonic external potential. In the hypothesis of δ interaction (i.e. $v_{int} = \sum_{i < j} \delta(\mathbf{x}_i - \mathbf{x}_j)$) REF reduces to

$$\text{shit} \tag{1}$$

2 Systems of N interacting fermions.

2.1 Hartree-Fock Theory.

interacting fermions

2.2 Density Functional Theory (DFT).

2.3 Atomic clusters.

atomic clusters

A Solution of the Schroedinger equation by diagonalization.

by diag

A Self-consistency