Tfy-3.4423 Computational Physics P (5 cr) Final exam 12.5.2010

Answers in Finnish or English

1. Explain **briefly** (a few lines maximum):
a) Random walk and diffusion
b) Importance sampling in Monte Carlo integration
c) Markov chain of Metropolis algorithm
d) Site percolation
e) Phase transition of Ising model
f) Solving Schrödinger equation on analytic basis
g) Spins and bits
h) Quantum Heisenberg model
i) Lanczos diagonalization
j) Sparse matrices
k) Mean-field approximation for bosons
l) Branching in diffusion quantum Monte Carlo

Use around one page (each line) for questions 2.-4:

2. Simulating growth: From microscopic models to surface roughness.

3. Solving Poisson equation using computers.

4. Monte Carlo methods for quantum systems.