Projects for Computational Physics

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Monte Carlo Optimisation:
The traveling salesman problem

Project Description

The traveling salesman problem (TSP) is a long-standing and often-discussed issue in computational physics and operations research: a traveling (owing to political correctness) salesperson has to find the shortest closed tour between a certain set of cities, where each city is only visited once during the tour. The problem can for instance be tackled quite efficiently using Monte Carlo algorithms.

Naturally, this problem has applications in many every-day problems, e.g. in finding directions using a route guiding system. Optimisation can be achieved with respect to different functions, e.g. the shortest path, the quickest path, and others.

Literature

[1] "Thermodynamical approach to the traveling salesman problem: An efficient simulation algorithm", V. Cerny, JOTA, Vol 45, No 1, 1985

[2] "Optimization of the time-dependent traveling salesman problem with Monte-Carlo methods", Bentner et al., Phys.Rev. E, 64, 036701

[3] "The traveling salesman problem: A computational study", D.L. Applegate, R.E. Bixby, V. Chvatal, W.J. Cook, Princeton University Press, 2007