Obiettivi: simulare un sistema compost da Coulomb charges in a two-dimensional trap (Thomson atomic model)

Simulate annealing method

We consider the following problem of optimization: finding the global optimum of a given function. Generally, the function can have a larger number of variables/degrees of freedom and an Newton steepest descent method can be inefficient as the number of local minimum can be large

A screen shot of a graph

Description automatically generated

A better efficiency can be obtained if the jump over barriers is allowed, so the deepest wells have larger probability of being considered.

A close-up of a drawing

Description automatically generated

The annealing method uses a fictitious temperature. Consider a function of interest to be minimized:

Using the metropolis algorithm sample the distribution where *T* is an artificial temperature:

And then lower the temperature.

A graph on a white board

Description automatically generated

The initial temperature should be larger than the height of the barrier Gradually decrease the temperature:

# Thomposon athom model

Metropolis algorithm implement:

1. Moving all particles (Global move)

Where are uniform random distributed variables

* Calculate