

## Portfolio Optimization using Genetic Algorithm and Simulated Annealing.

Simulated Annealing (SA) is an effective and general form of optimization. It is useful in finding global optima in the presence of large numbers of local optima. "Annealing" refers to an analogy with thermodynamics, specifically with the way that metals cool and anneal.

Genetic Algorithms (GAs) are search based algorithms based on the concepts of natural selection and genetics. In GAs, we have a pool or a population of possible solutions to the given problem. These solutions then undergo recombination and mutation (like in natural genetics), producing new children, and the process is repeated over various generations. Each individual (or candidate solution) is assigned a fitness value (based on its objective function value) and the fitter individuals are given a higher chance to mate and yield more "fitter" individuals. This is in line with the Darwinian Theory of "Survival of the Fittest"

### Application /Problem Statement

We can apply these techniques for portfolio optimization problem where the objective typically maximizes factors such as expected return and minimizes costs like financial risk.

The implementation is shown in the GA\_SA\_mpadhye.html file.