22nd Oct 2024   Lab-5

- Write a program to implement simulated Annealing Algorithm

Algorithm:

1. Initialize parameters
   → set the initial temperature T
   → Define the cooling rate d ($0 < d < 1$)
   → set the maximum number of iterations N

2. Generate Initial solution:
   → Generate a random initial solution S with the problem constraints.
   → Calculate the objective function value E(S)

3. Set Best Solutions
   → Initialize the solution Sbest as the initial solution S
   → Initialize the best energy Ebest as E(S)

4. For each iteration from 1 to N

   1. Generate new solution by slightly modifying the original solution

   2. Evaluate the new solution.

   3. if $E(S_{new}) < E(S)$:
      $$E(S) = E(S_{new})$$
      else
      $$P = e^{\frac{E(S) - E(S_{new})}{RT}}$$

4. If E(
   upd
   ups

5. Updo

output:
Iteration 0
        10c
        20
        30
        40
        50
        60
        70
        80
        90

Best sow

4. If $E(S_{new}) < E_{best}$
   update S_{best} to S_{new}
   update E_{best} to $E(S_{new})$

5. Update temperature: $T = T \times \alpha$

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22/10/24

output:

Iteration		
Iteration 0	$T = 10.00$	Evaluation: 23.63658
100	$T = 0.099$	Evaluation 9.01327
200	$T = 0.050$	Evaluation 8.95493
300	$T = 0.033$	Evaluation 8.95493
400	$T = 0.025$	Evaluation 8.95493
500	$T = 0.20$	Evaluation 8.95493
600	$T = 0.017$	Evaluation 8.95493
700	$T = 0.014$	Evaluation 8.95493
800	$T = 0.012$	Evaluation 8.95493
900	$T = 0.011$	Evaluation 8.95493

Best source: 8.954929764884854