School of Systems&Enterprises

EM 605

Elements of Operations Research

Metaheuristics Problems

STEVENS INSTITUTE of TECHNOLOGY
THE INNOVATION UNIVERSITY

While applying a simulated annealing algorithm to a certain problem, you've come to an iteration where the current value of T is T=2 and the value of the objective function for the current trial solution is 30. This trial solution has four immediate neighbors and their objective function values are 29, 34, 31, and 24. For each of these four immediate neighbors, in turn, you want to determine the probability that the move selection rule would accept this immediate neighbor if it is randomly selected to become the current candidate for the next trial solution.

- Determine the probability for each of the immediate neighbors when the objective is the maximization of the objective function
- Determine the probability for each of the immediate neighbors when the objective is the minimization of the objective function.

Here's a word-matching problem, using a genetic algorithm approach.

In honor of William Shakespeare, who was baptized on April 26 in 1564, our goal is to evolve the expression "to be or not to be" from the randomly-generated list of letters shown below

Fitness is calculated as the number of matched letters

(For example, the value of the fitness function for "rzfqdhujardbe" is 2)

rzfqdhujardbe	niedwvyvjahfj	scyueisosqvcb
fbfvramtekuvs	kbuqrtjtjensb	fwyqykktzyojh
tbxblsoizggwm	eoourhdxbvtxa	dtriuosrgkmbg
jvpbgemtpjalq		

His exact birth date Is unknown, and he died on April 23, 1616 at the (approximate) age of 52

Your job is to determine:

- The encoding schema that makes the most sense for representing the string
- Two generations of children, using a uniform crossover strategy, and a mutation rate of 0.15
- How many generations you think it would take to evolve to the desired phrase
- If there is another crossover strategy that might make more sense