

Unit 7 - Week 5

Course outline

How does an NPTEL online course work?

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Week 5

● Lecture 21: GA Operator : Crossover (Contd.)

● Lecture 22: GA Operator : Crossover (Contd.)

□ Lecture 23: GA Operator : Mutation and others

● Lecture 24: Multi-objective optimization problem solving

● Lecture 25: Multi-objective optimization problem solving (Contd.)

● Lecture material for Week 5

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Week 5 Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) Which GA operation is computationally most expensive?

1 point

- a. Initial population creation.
- b. Selection of sub-population for mating.
- c. Reproduction to produce next generation.
- d. Convergence testing.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

2) The meaning of "Stationary crossover" in real-coded GA is

1 point

- a. The spread of children is less than the parents.
- b. The spread of children is same as that of the parents.
- c. The spread of children is more than the parents.
- d. None of the above.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

3) Which of the following is not a mutation operation in real coded GA?

1 point

- a. Flipping.
- b. Random mutation.
- c. Polynomial mutation.
- d. All are mutation operation in real coded GA

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

4) Two parent chromosomes in Order GA encoding scheme is given as follows:

1 point

			*							
1	2	3	4	5	6	7	8	9	10	
			*							
10	9	8	7	6	5	4	3	2	1	

A K - point is selected at 4^{th} location according to single point crossover technique. Which of the following off-spring is not possible?

- a.

1	2	3	4	10	9	8	7	6	5	
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- b.

7	8	9	10	6	5	4	3	2	1	
---	---	---	----	---	---	---	---	---	---	--
- c.

10	9	8	7	1	2	3	4	5	6	
----	---	---	---	---	---	---	---	---	---	--
- d.

5	6	7	8	9	10	1	2	3	4	
---	---	---	---	---	----	---	---	---	---	--

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

5) If crossover between chromosomes in search space does not produce significantly different offspring, what does it imply? (if offspring consist of one half of each parent)

1 point

- (i) The crossover operation is not successful.
- (ii) Solution is about to be reached.
- (iii) Diversity is so poor that the parents involved in the crossover operation are similar.
- (iv) The search space of the problem is not ideal for GAs to operate.

- a. ii, iii & iv only.
- b. ii & iii only.
- c. i, iii & iv only.
- d. All of the above.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

6) In Rank-based selection scheme, which of the following is not correct?

1 point

- a. The % area to be occupied by an individual i , is given by $\frac{r_i}{\sum_{i=1}^N r_i}$
- b. Two or more individuals with the same fitness values should have the same rank.
- c. Individuals are arranged in a descending order of their fitness values.
- d. The proportionate based selection scheme is followed based on the assigned rank.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

7) Which of the following is not considered as a "convergence criteria"?

1 point

- a. Fixed number of generation is executed.
- b. Computation time is reached.
- c. Successive iterations no longer produce better result.
- d. A large number of children are produced.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

8) Which of the following is a fitness scaling approach?

1 point

- a. Linear scaling
- b. Sigma scaling
- c. Power law scaling
- d. All of the above

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

9) If selection pressure is **HIGH**, which one is **FALSE**

1 point

- a. The search focuses only on good individuals (in terms of fitness) at the moment.
- b. It loses the population diversity.
- c. Lower rate of convergence.
- d. Leads to pre-mature convergence of the solution to a sub-optimal solution

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

10) Which of the following comparison is true?

1 point

- a. GA is deterministic whereas other search algorithms are not.
- b. Under any circumstances, GAs always outperform other algorithms.
- c. The qualities of solutions offered by GAs for any problems are always better than those provided by other search.
- d. GAs could be applied to any problem, whereas certain algorithms are applicable to limited domains.

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
d.

11) Fitness scaling is desirable to ensure

1 point

- a. Population diversity
- b. Selection pressure
- c. That better solutions in a population are selected only
- d. Relatively inferior solutions are not ignored

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
a.

12) The crossover technique, which may suffer from end-point bias is

1 point

- a. Two-point crossover
- b. Single-point crossover
- c. Uniform crossover
- d. Half uniform crossover

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

13) Which of the following crossover technique uses Hamming distance?

1 point

- a. Multi point crossover
- b. Half uniform crossover
- c. Uniform crossover
- d. Shuffle crossover

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.

14) High selection pressure is desirable, when we need

1 point

- a. diversity not found in each generation
- b. there is no improvement in successive GA iteration
- c. faster termination of the GA
- d. fitness values are non-uniformly distributed

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
c.

15) Tournament selection scheme is more preferable when

1 point

- a. when fitness values are uniformly distributed
- b. population are with very diversified fitness values
- c. when fitness values are not necessarily uniformly distributed
- d. under all the above situations

- a.
 b.
 c.
 d.

No, the answer is incorrect.
Score: 0

Accepted Answers:
b.