
2. What is the difference between genotype and phenotype? [5]

3. Explain what the function of scaling is in the context of proportional selection. [7]

4. If selective pressure is too high, we risk premature convergence; however, if selective pressure is too low, the time to convergence will be unnecessarily long. If you were using rank based selection you could, for example, increase selective pressure by adjusting the probability of selection, which is expressed as a linear function of rank (the steepness of this function is the adjustable parameter). Now let us assume that instead you are using proportional selection. Come up with three (not two, not four, but exactly three!) parameters that you could now use to influence selective pressure. These may include standard parameters such as number of offspring, or novel parameters you invent specially for this purpose. Indicate very briefly how these parameters relate to selective pressure (e.g., increasing parameter X will decrease selective pressure). [12]

5. What is the difference between a ($\mu$, $\lambda$) competition strategy and a ($\mu + \lambda$) competition strategy? [6]

6. In the context of ES’es, state the Convergence Theorem and the conditions under which it holds. [10]

7. Formulate Rechenberg’s “1/5 success rule”. [7]

8. (a) Describe the special combination of characteristics that sets Genetic Programming (GP) apart from other EA’s. [10]

   (b) Illustrate (i.e., explain with drawings) how recombination works with GP accompanied by appropriate verbal commentary. [10]


   (b) What is the role of the Conflict Resolution mechanism in Learning Classifier Systems? [5]

10. The Two Pool EA was developed to optimize solutions for problems with a dynamic objective function, for instance incremental classification.

    (a) Explain the purpose of having two population pools instead of the usual one and briefly outline how the evolutionary cycle works with two population pools. [10]

    (b) What is the purpose of using a sliding window? [6]