Chaos Fuzzy Genetic Algorithm

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Abstract : The genetic algorithms have been very successful in handling difficult optimization problems. The fundamental problem in genetic algorithms is premature convergence. This paper, present a new fuzzy genetic algorithm based on chaotic values instead of the random values in genetic algorithm processes. In this algorithm, for initial population is used chaotic sequences and then a new sexual selection proposed for selection mechanism. In this technique, the population is divided such that the male and female would be selected in an alternate way. The layout of the male and female chromosomes in each generation is different. A female chromosome is selected by tournament selection size from the female group. Then, the male chromosome is selected, in order of preference based on the maximum Hamming distance between the male chromosome and the female chromosome or The highest fitness value of male chromosome (if more than one male chromosome is having the maximum Hamming distance existed), or Random selection. The selections of crossover and mutation operators are achieved by running the fuzzy logic controllers, the crossover and mutation probabilities are varied on the basis of the phenotype and genotype characteristics of the chromosome population. Computational experiments are conducted on the proposed techniques and the results are compared with some other operators, heuristic and local search algorithms commonly used for solving p-median problems published in the literature.

Keywords : genetic algorithm, fuzzy system, chaos, sexual selection
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