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| **Genetic Algorithm Tests** | | | |
| **Results of simple genetic algorithm** | | | |
|  | First Trial | Second Trial | Third Trial |
| Mutation Type = Random Reset  Mutation Rate = 0.01  Crossover Type = Two Point  Crossover Rate = 0.80  Selection Type = Tournament  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness = 22100  Best Fitness = 18400 | Start Fitness = 22200  Best Fitness = 19700 | Start Fitness = 21600  Best Fitness = 19100 |
| Mutation Type = Scramble  Mutation Rate = 0.01  Crossover Type = Two point  Crossover Rate = 0.90  Selection Type = Rank  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness = 22100  Best Fitness = 21800 | Start Fitness = 22400  Best Fitness = 21300 | Start Fitness = 22000  Best Fitness = 21600 |
| Mutation Type = Swap  Mutation Rate = 0.01  Crossover Type = One point  Crossover Rate = 0.70  Selection Type = Roulette Wheel  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| **Results of genetic algorithm with memetic algorithm** | | | |
| Mutation Type = Swap  Mutation Rate = 0.01  Crossover Type = One point  Crossover Rate = 0.70  Selection Type = Roulette wheel  Number of Iterations = 100  Population Size = 30  Memetic Rate= 0.20  Data = All data | Start Fitness = 21000  Best Fitness = 11200 | Start Fitness = 22200  Best Fitness = 10900 | Start Fitness = 21800  Best Fitness = 11600 |
| Mutation Type = Scramble  Mutation Rate = 0.01  Crossover Type = Two Point  Crossover Rate = 0.70  Selection Type = Tournament  Number of Iterations = 100  Population Size = 50  Memetic Rate= 0.20  Data = All data | Start Fitness = 21700  Best Fitness = 5700 | Start Fitness = 21600  Best Fitness = 5000 | Start Fitness = 20800  Best Fitness = 5600 |
| Mutation Type = Scramble  Mutation Rate = 0.01  Crossover Type = Two point  Crossover Rate = 0.70  Selection Type = Rank  Number of Iterations = 150  Population Size = 150  Memetic Rate= 0.20  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| **Results of genetic algorithm with culture algorithm** | | | |
| Mutation Type = Swap  Mutation Rate = 0.01  Crossover Type = One Point  Crossover Rate = 0.70  Selection Type = Roulette wheel  Number of Iterations = 100  Population Size = 50  Culture Acceptance Ratio = 0.30  Culture Influence Rate = 0.30  Data = All data | Start Fitness = 22000  Best Fitness = 16100 | Start Fitness = 22300  Best Fitness = 16700 | Start Fitness = 21900  Best Fitness = 16600 |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 250  Population Size = 50  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 250  Population Size = 50  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 150  Population Size = 50  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 500  Population Size = 100  Data = Small data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 100  Population Size = 30  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 250  Population Size = 50  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 250  Population Size = 50  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |
| Mutation Type =  Mutation Rate =  Crossover Type =  Crossover Rate =  Selection Type =  Number of Iterations = 250  Population Size = 50  Data = All data | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = | Start Fitness =  Best Fitness = |