|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| max | 738 | 751 | 738 | 751 | 750 | 751 | 747 | 751 | 747 | 751 | 747 | 751 | 751 | 751 | 738 | 751 |
| prob. | 0,03 | 0,07 | 0,03 | 0,07 | 0,07 | 0,10 | 0,03 | 0,10 | 0,03 | 0,07 | 0,03 | 0,10 | 0,03 | 0,27 | 0,03 | 0,17 |
| i-avg | 5,57 | 5,63 | 7,30 | 5,60 | 2,30 | 5,40 | 4,47 | 5,07 | 4,67 | 6,87 | 3,40 | 6,40 | 2,03 | 5,97 | 2,60 | 5,87 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 737 | 751 | 747 | 751 | 750 | 751 | 732 | 751 | 751 | 751 | 750 | 751 | 734 | 751 | 735 | 751 |
| 0,07 | 0,23 | 0,07 | 0,30 | 0,03 | 0,27 | 0,07 | 0,10 | 0,03 | 0,10 | 0,03 | 0,07 | 0,03 | 0,10 | 0,03 | 0,07 |
| 4,70 | 7,23 | 5,40 | 7,47 | 2,03 | 7,80 | 2,67 | 7,00 | 6,20 | 5,83 | 4,57 | 6,80 | 4,27 | 6,20 | 4,33 | 6,20 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 751 | 751 | 750 | 751 | 751 | 751 | 732 | 751 | 739 | 751 | 738 | 751 | 750 | 751 | 751 | 751 |
| 0,03 | 0,13 | 0,07 | 0,07 | 0,03 | 0,17 | 0,07 | 0,13 | 0,03 | 0,23 | 0,03 | 0,23 | 0,03 | 0,10 | 0,03 | 0,17 |
| 6,53 | 5,33 | 4,90 | 6,33 | 2,73 | 7,50 | 4,57 | 7,00 | 3,57 | 6,03 | 4,87 | 8,20 | 2,70 | 7,80 | 4,13 | 7,97 |

*Задача 9.2.1.1* ▲ *- глобальный оптимум* ▲ *- макс. вероятность до глобального оптимума*▲ *- мин. средн. число итераций до глобального оптимума*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| max | 665 | 670 | 664 | 670 | 666 | 670 | 669 | 670 | 670 | 670 | 669 | 670 | 667 | 670 | 670 | 670 |
| prob. | 0,07 | 0,07 | 0,03 | 0,13 | 0,03 | 0,03 | 0,03 | 0,13 | 0,03 | 0,17 | 0,03 | 0,20 | 0,03 | 0,07 | 0,03 | 0,17 |
| i-avg | 6,23 | 8,47 | 6,30 | 4,93 | 2,07 | 5,27 | 6,43 | 4,60 | 5,60 | 6,40 | 7,03 | 6,23 | 2,63 | 5,70 | 6,30 | 5,97 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 669 | 670 | 670 | 670 | 669 | 670 | 670 | 670 | 665 | 670 | 665 | 670 | 669 | 670 | 667 | 670 |
| 0,03 | 0,27 | 0,03 | 0,23 | 0,07 | 0,27 | 0,03 | 0,40 | 0,03 | 0,07 | 0,10 | 0,03 | 0,03 | 0,07 | 0,03 | 0,03 |
| 6,87 | 6,93 | 3,90 | 6,53 | 2,40 | 6,70 | 4,80 | 6,40 | 6,00 | 5,07 | 9,60 | 4,97 | 4,17 | 4,90 | 6,70 | 5,53 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 663 | 670 | 667 | 670 | 669 | 670 | 670 | 670 | 670 | 670 | 669 | 670 | 669 | 670 | 665 | 670 |
| 0,07 | 0,10 | 0,03 | 0,10 | 0,03 | 0,03 | 0,03 | 0,10 | 0,07 | 0,23 | 0,03 | 0,13 | 0,03 | 0,10 | 0,07 | 0,27 |
| 5,33 | 7,03 | 4,70 | 6,43 | 3,67 | 6,23 | 2,87 | 6,33 | 7,47 | 6,93 | 4,10 | 6,33 | 2,17 | 6,77 | 2,93 | 7,83 |

*Задача 9.2.1. 2* ▲ *- глобальный оптимум* ▲ *- макс. вероятность до глобального оптимума*▲ *- мин. средн. число итераций до глобального оптимума*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| max | 589 | 594 | 594 | 594 | 586 | 594 | 590 | 594 | 589 | 594 | 589 | 594 | 590 | 594 | 594 | 594 |
| prob. | 0,03 | 0,07 | 0,07 | 0,10 | 0,10 | 0,10 | 0,03 | 0,03 | 0,03 | 0,07 | 0,10 | 0,03 | 0,03 | 0,07 | 0,03 | 0,10 |
| i-avg | 10,83 | 8,57 | 6,33 | 5,83 | 2,17 | 6,83 | 10,30 | 6,60 | 6,83 | 5,73 | 4,53 | 6,03 | 3,20 | 6,47 | 8,03 | 7,67 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 594 | 594 | 594 | 594 | 590 | 594 | 594 | 594 | 590 | 594 | 590 | 594 | 589 | 594 | 586 | 594 |
| 0,03 | 0,20 | 0,07 | 0,13 | 0,07 | 0,20 | 0,03 | 0,10 | 0,03 | 0,10 | 0,03 | 0,07 | 0,03 | 0,10 | 0,03 | 0,10 |
| 4,77 | 6,77 | 6,40 | 8,60 | 2,27 | 5,73 | 10,70 | 6,83 | 8,07 | 7,50 | 6,63 | 6,10 | 2,40 | 4,90 | 11,37 | 6,00 |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 594 | 594 | 594 | 594 | 589 | 594 | 590 | 590 | 590 | 594 | 590 | 594 | 589 | 594 | 589 | 590 |
| 0,03 | 0,03 | 0,07 | 0,03 | 0,07 | 0,03 | 0,03 | 0,03 | 0,07 | 0,13 | 0,07 | 0,13 | 0,07 | 0,13 | 0,10 | 0,27 |
| 5,57 | 5,80 | 4,60 | 7,03 | 3,50 | 6,50 | 6,10 | 6,07 | 5,83 | 6,57 | 4,87 | 6,20 | 2,53 | 6,97 | 3,23 | 7,03 |

*Задача 9.2.1.3* ▲ *- глобальный оптимум* ▲ *- макс. вероятность до глобального оптимума*▲ *- мин. средн. число итераций до глобального оптимума*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| max | 647 | 650 | 649 | 650 | 650 | 650 | 649 | 650 | 648 | 650 | 648 | 650 | 650 | 650 | 650 | 649 |
| prob. | 0,03 | 0,07 | 0,03 | 0,03 | 0,03 | 0,07 | 0,03 | 0,07 | 0,03 | 0,10 | 0,03 | 0,03 | 0,03 | 0,07 | 0,03 | 0,17 |
| i-avg | 5,33 | 5,07 | 4,10 | 7,37 | 2,23 | 5,57 | 3,50 | 5,97 | 3,57 | 6,70 | 5,10 | 8,73 | 2,43 | 5,67 | 6,17 | 6,47 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 644 | 650 | 648 | 650 | 649 | 650 | 650 | 650 | 649 | 649 | 648 | 650 | 642 | 650 | 650 | 650 |
| 0,07 | 0,20 | 0,03 | 0,13 | 0,03 | 0,07 | 0,03 | 0,17 | 0,07 | 0,07 | 0,07 | 0,07 | 0,07 | 0,10 | 0,03 | 0,10 |
| 5,80 | 6,93 | 5,23 | 7,50 | 2,20 | 6,80 | 4,27 | 6,10 | 6,40 | 6,00 | 8,07 | 6,37 | 2,80 | 4,70 | 7,23 | 5,47 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 649 | 649 | 646 | 650 | 647 | 650 | 649 | 649 | 648 | 650 | 647 | 650 | 648 | 650 | 648 | 650 |
| 0,03 | 0,10 | 0,07 | 0,07 | 0,03 | 0,17 | 0,03 | 0,07 | 0,03 | 0,03 | 0,03 | 0,17 | 0,03 | 0,13 | 0,03 | 0,13 |
| 4,07 | 5,77 | 7,33 | 6,40 | 2,50 | 6,03 | 4,47 | 6,30 | 5,23 | 6,13 | 4,67 | 7,47 | 2,53 | 6,17 | 4,73 | 6,73 |

*Задача 9.2.1.4* ▲ *- глобальный оптимум* ▲ *- макс. вероятность до глобального оптимума*▲ *- мин. средн. число итераций до глобального оптимума*

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| max | 741 | 741 | 734 | 741 | 738 | 741 | 741 | 741 | 739 | 741 | 734 | 741 | 741 | 741 | 738 | 741 |
| prob. | 0,07 | 0,03 | 0,03 | 0,07 | 0,03 | 0,07 | 0,03 | 0,10 | 0,03 | 0,13 | 0,03 | 0,10 | 0,03 | 0,20 | 0,03 | 0,20 |
| i-avg | 9,07 | 6,50 | 2,90 | 6,40 | 2,07 | 4,80 | 6,20 | 5,23 | 7,37 | 5,40 | 6,67 | 6,57 | 2,60 | 6,13 | 6,37 | 6,17 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 741 | 741 | 735 | 741 | 741 | 741 | 741 | 741 | 734 | 741 | 739 | 741 | 733 | 741 | 741 | 739 |
| 0,03 | 0,23 | 0,03 | 0,23 | 0,03 | 0,13 | 0,03 | 0,27 | 0,07 | 0,13 | 0,03 | 0,13 | 0,07 | 0,07 | 0,03 | 0,10 |
| 5,17 | 7,27 | 7,10 | 6,53 | 2,53 | 7,60 | 4,90 | 6,87 | 10,17 | 6,03 | 5,20 | 5,67 | 1,93 | 4,83 | 3,87 | 5,93 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 741 | 741 | 735 | 741 | 738 | 741 | 741 | 741 | 738 | 741 | 741 | 741 | 735 | 741 | 735 | 741 |
| 0,03 | 0,20 | 0,03 | 0,17 | 0,10 | 0,10 | 0,07 | 0,23 | 0,07 | 0,17 | 0,03 | 0,07 | 0,03 | 0,20 | 0,03 | 0,30 |
| 6,90 | 7,67 | 4,40 | 8,13 | 2,20 | 6,83 | 6,13 | 6,77 | 6,60 | 5,67 | 4,80 | 7,50 | 2,23 | 6,37 | 5,63 | 7,10 |

*Задача 9.2.1.5* ▲ *- глобальный оптимум* ▲ *- макс. вероятность до глобального оптимума*▲ *- мин. средн. число итераций до глобального оптимума*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | | Danzig \_algorithm  Single-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Single-point crossover  Saltation  Linear-rank | Danzig \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Point mutation  Linear-rank | Danzig \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Inversion  Linear-rank | Danzig \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Translocation  Linear-rank | Danzig \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Two-point crossover  Saltation  Linear-rank |
| dev.% | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,15 | 0 | 0 | 0 | 0 | 0 |
| prob.(avg) % | 1,33 | 6,00 | 1,33 | 8,00 | 0,67 | 7,33 | 0,67 | 8,67 | 0,67 | 10,67 | 0,67 | 9,33 | 2,00 | 13,34 | 2,00 | 12,67 |
| i-avg | 4,53 | 17,12 | 3,17 | 15,07 | 1,12 | 13,93 | 3,10 | 13,73 | 2,80 | 15,55 | 3,52 | 16,98 | 3,53 | 14,97 | 10,25 | 12,84 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Danzig \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Point mutation  Linear-rank | Danzig \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Inversion  Linear-rank | Danzig \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Translocation  Linear-rank | Danzig \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Danzig \_algorithm  Uniform crossover  Saltation  Linear-rank | Random \_algorithm  Single-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Single-point crossover  Point mutation  Linear-rank | Random \_algorithm  Single-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Single-point crossover  Inversion  Linear-rank | Random \_algorithm  Single-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Single-point crossover  Translocation  Linear-rank | Random \_algorithm  Single-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Single-point crossover  Saltation  Linear-rank |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,13 | 0 | 0,15 | 0 | 0 | 0 |
| 1,33 | 22,67 | 2,00 | 20,66 | 0,67 | 18,67 | 2,66 | 20,67 | 0,67 | 8,00 | 0,67 | 7,33 | 0,67 | 8,67 | 1,33 | 6,00 |
| 4,97 | 17,57 | 5,15 | 18,32 | 1,27 | 17,32 | 12,33 | 16,60 | 3,10 | 12,22 | 2,28 | 14,95 | 2,08 | 12,77 | 5,55 | 11,60 |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Random \_algorithm  Two-point crossover  Point mutation  Betta-Tournament | Random \_algorithm  Two-point crossover  Point mutation  Linear-rank | Random \_algorithm  Two-point crossover  Inversion  Betta-Tournament | Random \_algorithm  Two-point crossover  Inversion  Linear-rank | Random \_algorithm  Two-point crossover  Translocation  Betta-Tournament | Random \_algorithm  Two-point crossover  Translocation  Linear-rank | Random \_algorithm  Two-point crossover  Saltation  Betta-Tournament | Random \_algorithm  Two-point crossover  Saltation  Linear-rank | Random \_algorithm  Uniform crossover  Point mutation  Betta-Tournament | Random \_algorithm  Uniform crossover  Point mutation  Linear-rank | Random \_algorithm  Uniform crossover  Inversion  Betta-Tournament | Random \_algorithm  Uniform crossover  Inversion  Linear-rank | Random \_algorithm  Uniform crossover  Translocation  Betta-Tournament | Random \_algorithm  Uniform crossover  Translocation  Linear-rank | Random \_algorithm  Uniform crossover  Saltation  Betta-Tournament | Random \_algorithm  Uniform crossover  Saltation  Linear-rank |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0,13 | 0 | 0 | 0 |
| 2,00 | 9,33 | 1,33 | 8,67 | 0,67 | 10,00 | 2,00 | 9,33 | 1,33 | 16,00 | 0,67 | 14,67 | 0,67 | 13,33 | 0,67 | 17,33 |
| 9,50 | 12,92 | 2,30 | 17,16 | 1,37 | 16,55 | 4,50 | 10,05 | 3,73 | 15,67 | 2,40 | 17,85 | 1,35 | 17,04 | 2,07 | 14,82 |

*Суммарный отчет для класса тестовых задач c корреляцией* ▲ *– отклонение от оптимума в процентах,* ▲ *– максимальная средняя вероятность*