**Table 3. Comparison between FIQL, CQL, PSO, GWO and DA in improved grid map.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Map | Statistics | | FIQL | CQL | PSO | GWO | DA |
| Map(1) | Path length | Mean  Std Dev.  *t*-test | 21.421  4.368  - | 24.151  2.912  6.072e-3 | 25.591  1.938  1.661e-5 | 22.728  2.638  1.658e-5 | 23.299  2.851  5.324e-2 |
| Time | Mean | 11.184 | 13.838 | 9.795 | 10.201 | 8.872 |
| Map(2) | Path length | Mean  Std Dev.  *t*-test | 23.465  3.483  - | 25.759  3.167  9.845e-3 | 24.534  3.275  2.261e-1 | 24.204  3.627  4.244e-1 | 24.238  3.446  3.909e-1 |
| Time | Mean | 11.551 | 13.364 | 11.264 | 9.772 | 10.064 |
| Map(3) | Path length | Mean  Std Dev.  *t*-test | 24.801  3.543  - | 25.493  3.271  4.434e-1 | 26.524  2.727  3.899e-2 | 25.456  3.001  4.423e-1 | 25.571  2.535  3.362e-1 |
| Time | Mean | 12.097 | 14.744 | 10.223 | 10.764 | 11.846 |
| Map(4) | Path length | Mean  Std Dev.  *t*-test | 17.718  2.904  - | 20.128  1.087  7.674e-5 | 19.061  1.256  2.362e-2 | 20.272  1.619  7.089e-5 | 21.094  2.077  2.928e-6 |
| Time | Mean | 10.571 | 11.692 | 8.842 | 8.757 | 9.035 |
| Map(5) | Path length | Mean  Std Dev.  *t*-test | 18.475  2.062  - | 19.737  0.647  1.136e-2 | 20.207  1.301  1.688e-3 | 21.173  1.957  2.623e-5 | 22.569  2.132  9.594e-9 |
| Time | Mean | 11.756 | 12.784 | 8.826 | 8.433 | 8.686 |
| Map(6) | Path length | Mean  Std Dev.  *t*-test | 19.929  3.908  - | 21.895  1.688  4.254e-2 | 20.291  1.381  6.991e-1 | 21.647  2.628  6.658e-3 | 21.459  2.489  5.023e-2 |
| Time | Mean | 10.912 | 11.916 | 8.207 | 8.822 | 9.956 |