COMP 4106
Assignment 3, Reinforcement Learning

Krystian Wojcicki, 101001444

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1 Introduction

Four different schemes were used. Tsetlin, Krinsky, Krylov and L_{RI}. I assumed the noise parameter to have a sigma of 1.0 and for the Q function to map $Q(i) = i$. For each the hyper parameters were attempted to keep similar in order to do a fair comparison between the 4.

2 Tsetlin

For the Tsetlin automata a memory value of 5 was utilized. With a transient time for learning of 10,000 and then 1000 iterations in order to test the accuracy. The accuracy was as follows $[0.9818, 0.0062, 0.0032, 0.0029, 0.0029, 0.003]$ with a speed of converge equal to 44.25 across an ensemble average of 100 experiments.

3 Krinsky

For the Krinsky automata a memory value of 5 was utilized. With a transient time for learning of 10,000 and then 1000 iterations in order to test the accuracy. The accuracy was as follows $[9.877e-01, 8.100e-03, 9.000e-04, 1.000e-03, 1.200e-03, 1.100e-03]$ with a speed of converge equal to 43.25 across an ensemble average of 100 experiments.

4 Krylov

For the Krinsky automata a memory value of 5 was utilized. With a transient time for learning of 10,000 and then 1000 iterations in order to test the accuracy. The accuracy was as follows $[0.9584, 0.04, 0., 0., 0., 0.0016]$ with a speed of converge equal to 112.75 across an ensemble average of 100 experiments.

5 L_{RI}

For the L_{RI} automata a learning rate of 0.03% was utilized. With a transient time for learning of 10,000 and then 1000 iterations in order to test the accuracy. The accuracy was as follows $[9.98e-01, 1.80e-03, 1.00e-04, 0.00e+00, 0.00e+00, 1.00e-04]$ with a speed of converge equal to 234.5 across an ensemble average of 100 experiments.

6 Conclusion

Overall all the models had very similar accuracy with L_{RI} having a slight edge with Krylov relatively behind the rest of the bunch. In terms of speed there was a large difference, L_{RI} took much longer to converge compared to the other models. Krylov also took a relativly large time to converge, but significantly quicker than L_{RI}. Tsetlin and Krinsky had very similar convergence.