State Episodes

Does semi-gradient TD with a neural network find a good approximation within 5000 episodes?

As you may remember from the previous assignment, semi-gradient TD with 10-state aggregation converged within 100 episodes. Why is TD with a neural network slower?

Would it be faster if we decrease the number of hidden units? Or what about if we increase the number of hidden units?

2-2: Compare Performance of Semi-gradient TD with a Neural Network and Semi-gradient TD with Tile-coding

In this section, we compare the performance of semi-gradient TD with a Neural Network and semi-gradient TD with tile-coding. Tile-coding is a kind of coarse coding that uses multiple overlapping partitions of the state space to produce features. For tile-coding, we used 50 tilings each with 6 tiles. We set the step-size for semi-gradient TD with tile-coding to $\frac{0.1}{\text{\# tilings}}$. See the figure below for the comparison between semi-gradient TD with tile-coding and semi-gradient TD with a neural network and Adam algorithm. This result is for 5000 episodes and 20 runs: