Artificial Neural Networks: Session 1

Study of different learning scheme

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1 Experimental setup

We consider a time-serie $y = sin(x2)$ for $x \in [0, 3\pi]$.
We train a neural network with one hidden layer of width w to approximate it.
The training set spans across the entire definition domain starting at 0 with step s.
The test set spans across the entire definition domain starting at $s/2$ with step s.
The shift allow to assess generalization capacity of the learning scheme.
For each set of hyperparameter

2 Speed comparison

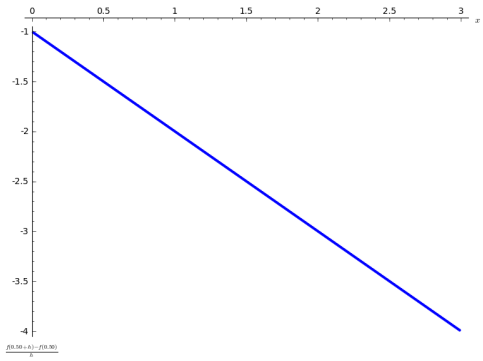

Figure 1: Convergence perf r1 r15 r1000

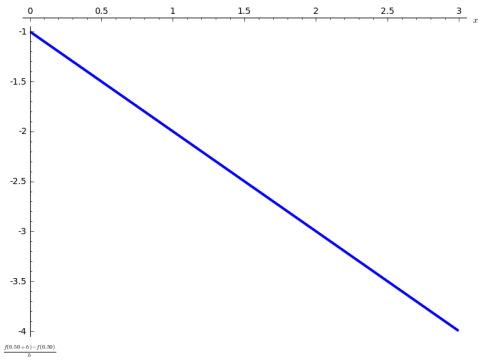

Figure 2: speed comparison

3 Noise robustness

4 Overfitting

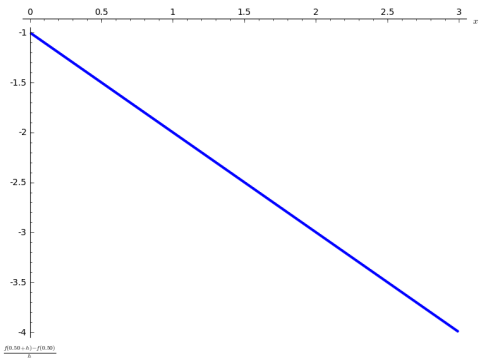

Figure 3: Perf with gaussian noise

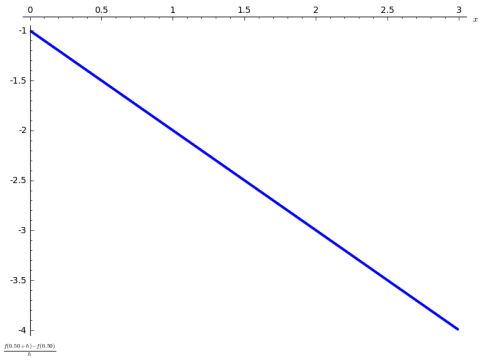

Figure 4: perf with gaussian noise and more points

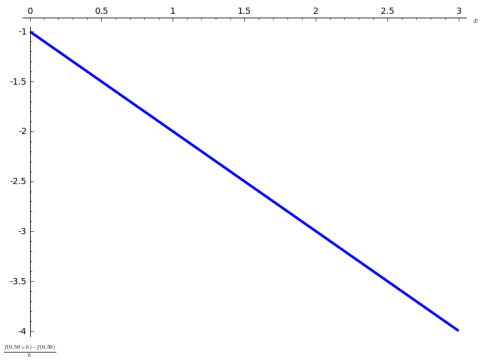

Figure 5: overfitting by points

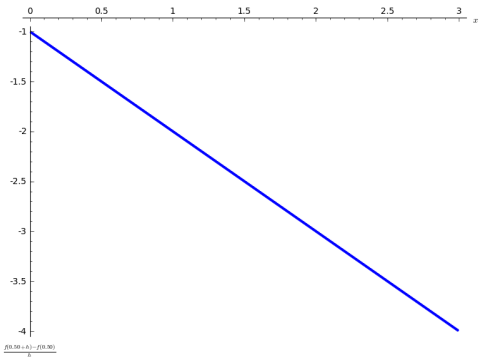

Figure 6: overfitting by neurons

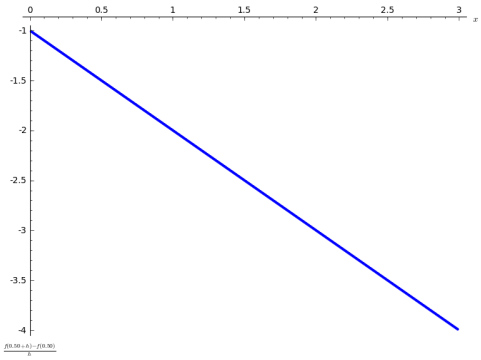

Figure 7: overfitting by time series

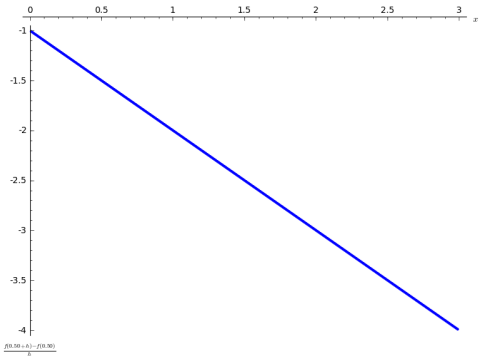

Figure 8: overfitting by neurons