Machine Learning
# Assignment 1
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Here, we have implemented stochastic gradient descent and fit a sinusoid with random noise using polynomial regression. The learning rate α was selected by looking at graphs of the RMS error for different learning rates. We observed that the number of iterations to meet our convergence condition decreased until a certain point, and then diverged at $\alpha < 0.45$
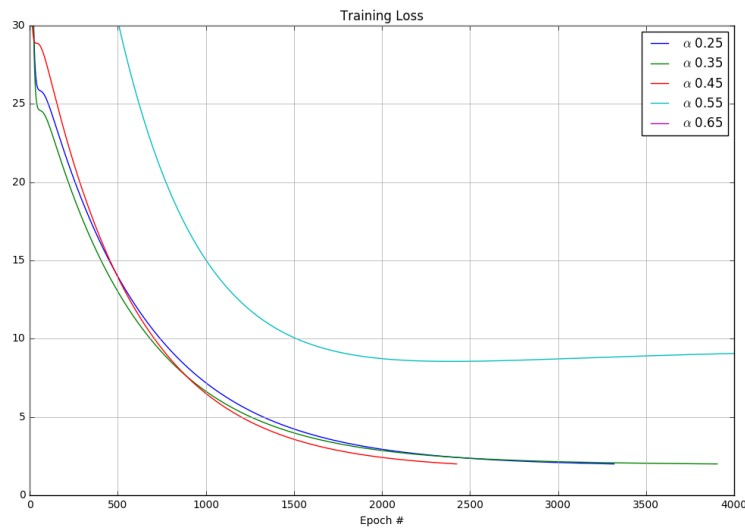
For the models trained with $0.25 \leq \alpha \leq 0.45$ we see a progressive reduction in the number of iterations required for convergence (i.e., the epoch

count) as well as the RMS training error. With $\alpha > 0.45$ we see worse RMS training error, in addition to more iterations (both of which are unacceptable. Therefore, we let $\alpha = 0.45$ and build our model as seen below. Note that there is almost certainly a more optimal selection of α, but this level of precision suffices for the task.