Assignment 5 – Programming Part

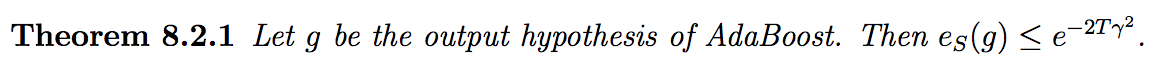
**Code Location:** home/cc/students/cs/orperel/intro\_to\_ml/ex5

**Question 1**

**b.** Using the Decision Stumps algorithm as a weak learner, and AdaBoost with 100 iterations, we obtain the following graph:



The results are consistent with the theory –



In other words, the training error drops exponentially fast. Indeed, the training error graph shows a steady continuous drop and presents a behavior of a function bounded from above by .

We also note that the Weak Learner classifier already did a plausible job, and therefore we get a low error of about 5% to begin with (though this doesn’t formally prove that is high for this problem set).

Another key observation is that the training error converges to zero after rounds. Taking approximations of we get iterations where indeed the training error graph converges to zero.

The test error keeps decreasing even after the training error approaches zero due to margin-based explanations not discussed in the course. Notice the slight increment in test error by around round 95, which can be attributed to AdaBoost overfitting the training data.