

Machine Learning

ECE 4370 / ECE 5370

Project 2

1. Generate the training set:
 - a. $N^{Train} = 10$
 - b. X^{Train} contains samples from a uniform distribution $\mathcal{U}(0,1)$.
 - c. $t^{Train} = \sin(2\pi X^{Train}) + \varepsilon$, where ε is drawn from a Gaussian (Normal) distribution $\mathcal{N}(0, \sigma=0.3)$.
2. Generate the test set:
 - a. $N^{Test} = 100$
 - b. X^{Test} contains samples from a uniform distribution $\mathcal{U}(0,1)$.
 - c. $t^{Test} = \sin(2\pi X^{Test}) + \varepsilon$, where ε is drawn from a Gaussian distribution $\mathcal{N}(0, \sigma=0.3)$.
3. Use the method of linear regression with non-linear models to fit polynomials of degree $M = 0, 1, 2, \dots, 9$ to the training set.
4. Record the training and testing errors for each of the 10 cases.
5. Produce the plot as shown below, where

$$E_{RMS} = \sqrt{J(\underline{w})/N}$$

6. Repeat the exercise for $N^{Train} = 100$.

Upload your .m or .py file to Blackboard prior to the deadline.
Name your files as Lastname_Firstname_Project2.*

