

CSc 59929
Introduction to Machine Learning
Assignments for Week 6
Due October 10 by 10:59 AM

- **Compete the programming exercise described on the following charts.**

Programming Exercise

- Download the Polynomial Curve Fitting Code that we reviewed in class and review it.
- Extend the curve fitting class *PolyFit* to include a power weighting penalty to the L1 and L2 regularization cost function and cost gradient expressions. You can assume that $p=1$. Adding this term will tend to reduce the polynomial coefficients for higher order terms. See the lecture slides for *Polynomial Curve Fitting* for the details of the formulas.

Programming Exercise

- Run the following type of test cases:
 - No Regularization
 - L2 Regularization without the power parameter.
 - L2 Regularization with the power parameter.
 - L1 Regularization without the power parameter.
 - L1 Regularization with the power parameter.
 - For each type of test cases try at least three different values of λ .
 - In running the cases above you may need to adjust other parameters (such as the number of iterations and the learning rate) from their current values.

Programming Exercise

- Summarize your results in a table that includes a row for each test case and columns for each of the parameters you varied and for how well it converged and how many epochs it took to converge.
- Submit both your code and your summary table.