Machine Learning HW#4

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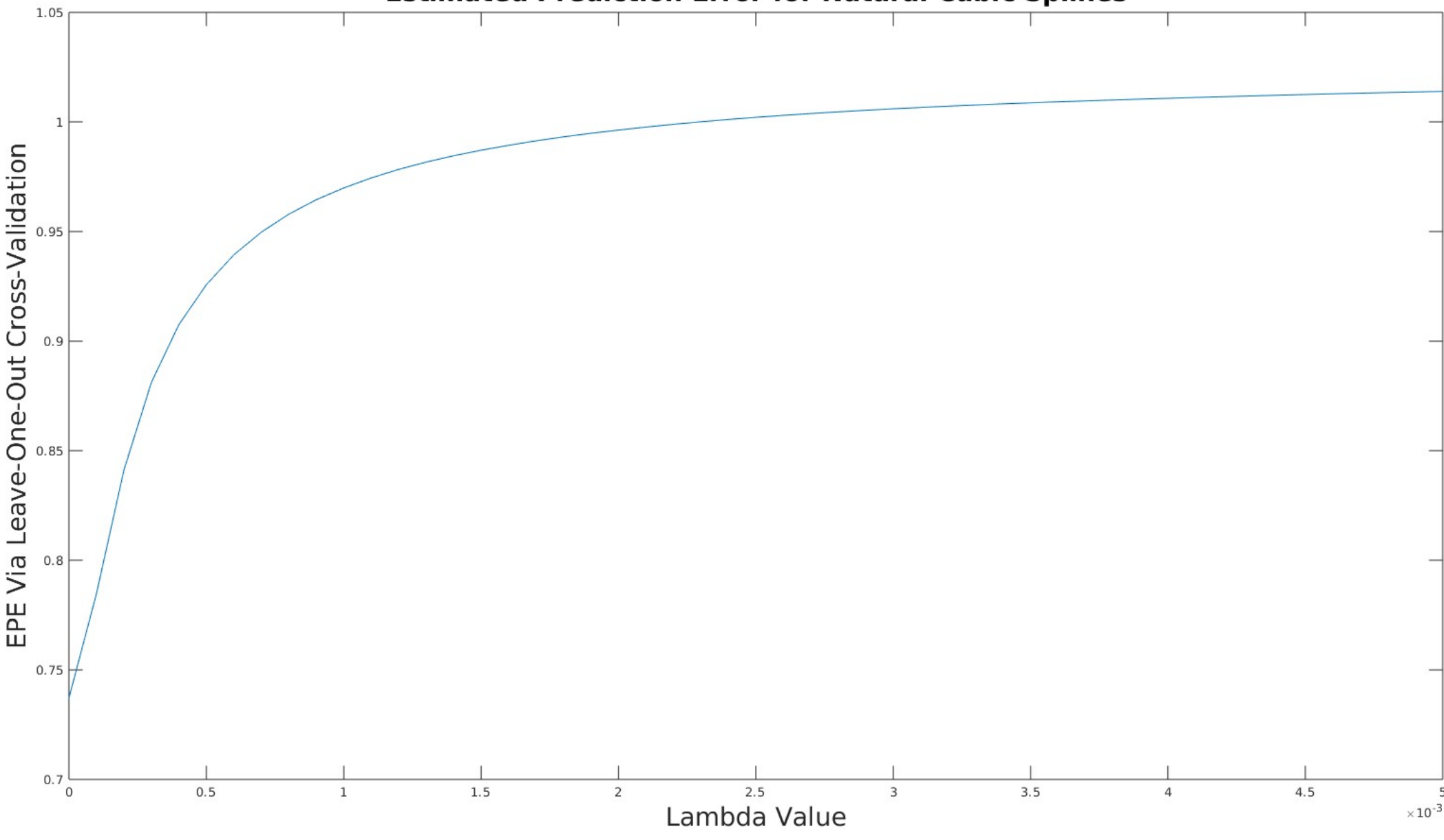
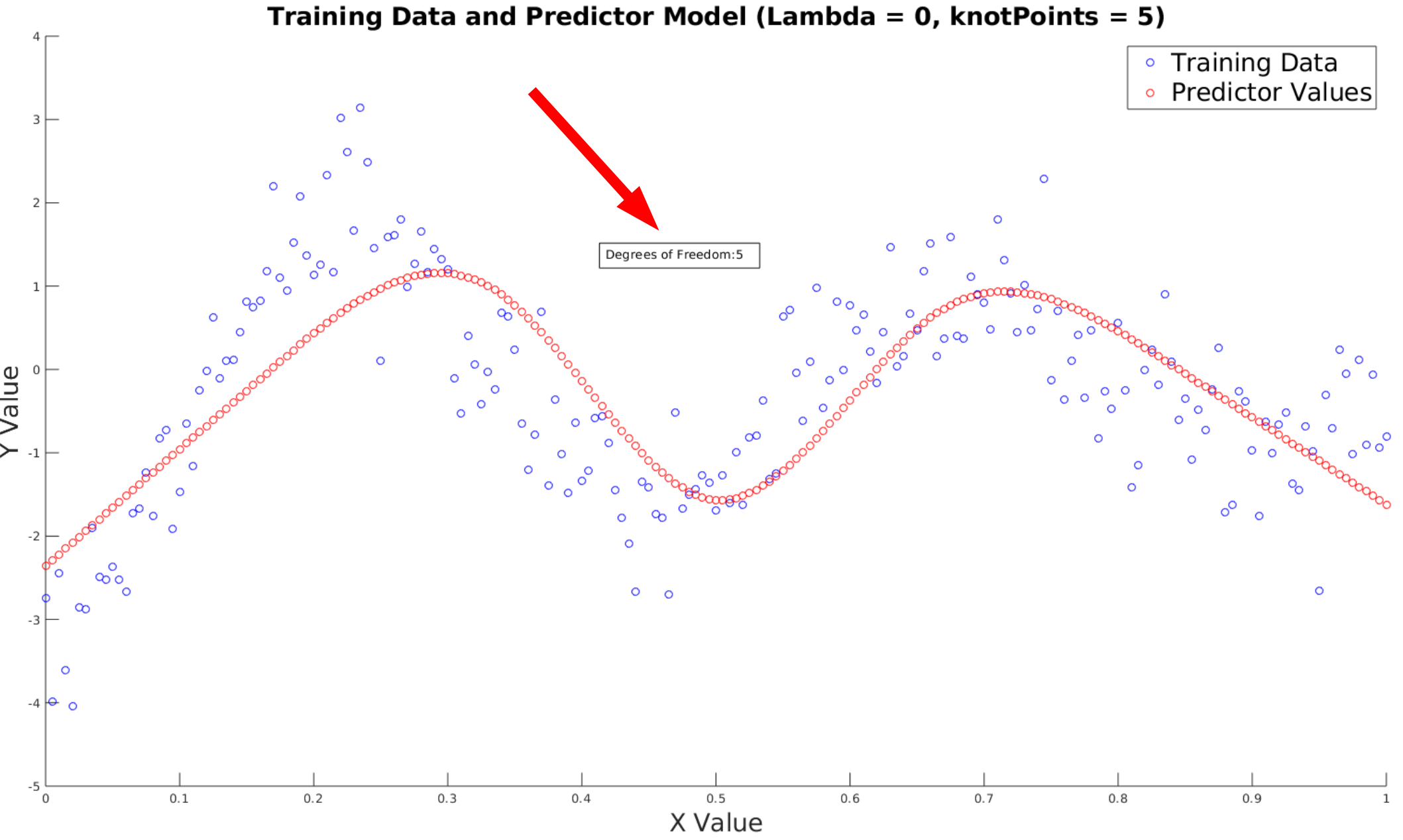
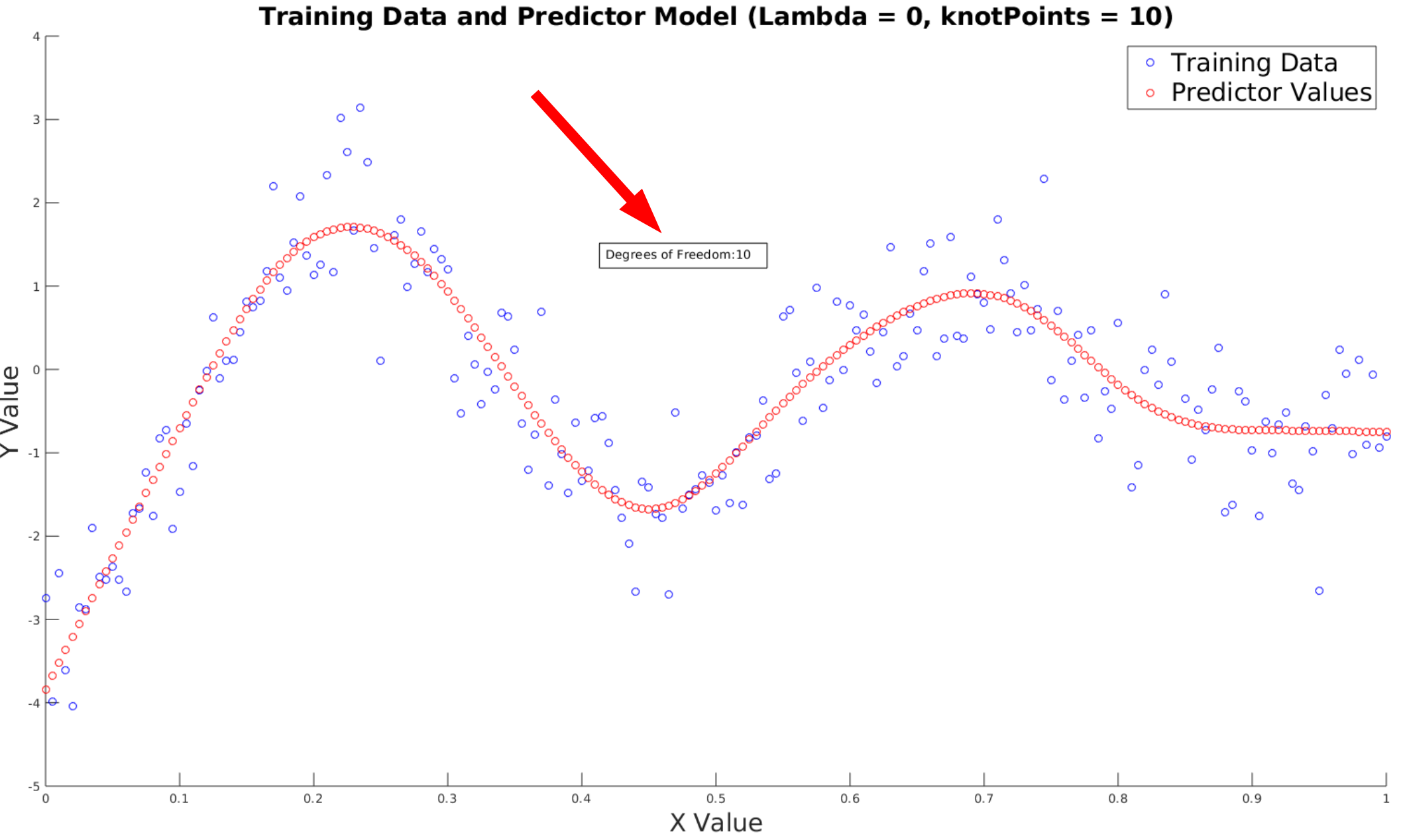
Problem 1 – EPE Results (Knots = 5)



Problem 1 (5 Knot Points)



Problem 1 (10 Knot Points)



Problem 1 Analysis

- Lambda of 0 for knotPoints = 5 gives lowest EPE
- This makes sense since slide 3 shows that knotPoints = 5 is “underfitting” the training data while knotPoints = 10 is “just right”
- Therefore, introducing regularization parameter will make the error higher since there is no overfitting with knotPoints = 5
- For lowest EPE, we have that the trace of the S matrix is 5 so we have 5 degrees of freedom for lowest EPE (given knotPoints = 5)

Problem 1 Code Description

- The ‘nls.m’ file is where the EPE Cross-Validation test is performed with the natural cubic splines algorithm
- The ‘cubicCode.m’ file is where the plots of training data vs predictor values are generated
- Both files can accept however many knotPoints the user desires as well as the filename of the training file
- The trace of the S matrix is calculated and displayed as an annotation in the plots as shown in slide 3 and 4