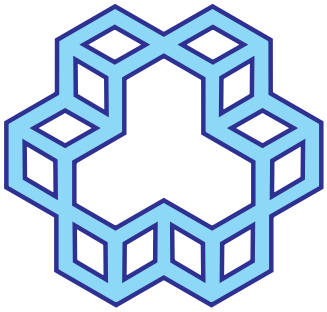

K. N. Toosi University of Technology

Faculty of Physics
Educational Group of
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Machine Learning Problem Sets (Problem Set 2)

by
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(First Semester)

Contents

1 Gradient Descent

Write a program that uses the gradient descent algorithm to find the best values of parameters a and b in a linear regression model. Evaluate your program with some test case.

Note: Be sure to leave appropriate comments for different parts of your code. A part of your score is allocated to your comments and explanations.

2 Minimizer in Linear Regression (Bonus)

Show that the minimizer for least-squares linear regression with L_2 regularization is $\mathbf{w} = \left(\lambda \mathbf{I} + \mathbf{\Phi}^T \mathbf{\Phi}\right)^{-1} \mathbf{\Phi}^T \mathbf{t}$.

Note: To solve this question, you can use chapter 3 of the Pattern Recognition and Machine Learning (Bishop) book.