# Multiple Linear Regression. In-class Exercise 3

EL-GY 6143 Intro Machine Learning. Prof. Sundeep Rangan

## Question

We are given the following data

|  |  |  |  |
| --- | --- | --- | --- |
| Sample number | Target | Feature 1 | Feature 2 |
| 1 | 3.0 | 0 | 1 |
| 2 | 5.0 | 2 | 3 |
| 3 | 9.0 | 4 | 8 |
| 4 | 10.0 | 6 | 10 |

## Q1. Write the equations to solve for the linear model using all four data points

## Write the feature matrix and the equations for coefficients.

## Do not solve them (you would need a computer)

## Q2. Can you find parameters that exactly fits the first three data points?

## Just state if such parameters exist. You do not need to find them.

## Solution

Q1. The feature matrix and target vector are:

The coefficients in the model is:

Q2. If we look at only the first three data points, we have:

To get an exact fit, we want . This is possible since, in this case, is invertible (it is square and you can check that columns are linearly independent). So you can select