

**Homework 3**(Due: Feb 27<sup>th</sup> 2007)**Multilinear Regression**

**Write a program in R** to solve the following problem. You are required to use matrix operations (multiplication, QR decomposition, SVD, etc.) in your implementation instead of using the linear regression functions (such as `lsfit`, `lm`, `glm`, etc.) directly. Please email the source code with compiling/running instructions to the TAs (Jiang Du: [jiang.du@yale.edu](mailto:jiang.du@yale.edu); Edo Liberty: [edo.liberty@yale.edu](mailto:edo.liberty@yale.edu)).

Dataset: The following table tries to relate a student's score in the exam to various factors (e.g. IQ, time spent on homework, scores in homework, time spent on exam). Assume the relation can be modeled linearly, which means the score in exam is a linear combination of all the 6 factors (the first 6 columns in the table) plus a certain constant. Please use the first 9 students' records to construct the multilinear model, use this model to predict the scores of all the students in the exam, and then show the performance of this model using either plots or quantitative measures such as RMS (root mean square: [http://en.wikipedia.org/wiki/Root\\_mean\\_square](http://en.wikipedia.org/wiki/Root_mean_square)).

IQ	Time spent on homework 1	Score in homework 1	Time spent on homework 2	Score in homework 2	Time spent on Exam	Score in Exam
98	74	71	80	67	82	72
109	87	77	93	75	93	80
121	85	84	91	77	96	84
105	127	80	122	91	118	88
96	90	68	90	71	91	71
95	116	76	111	84	110	80
155	51	100	75	74	80	93
131	131	97	132	100	131	100
96	129	74	123	89	121	84
110	87	80	92	76	95	80

For your convenience, we provide an R script containing this dataset. You can choose to start programming with this script or write your own code.