2.830J / 6.780J / ESD.63J Control of Manufacturing Processes (SMA 6303)
Spring 2008

Department of Mechanical Engineering
Department of Electrical Engineering and Computer Science

2.830J/6.780J Control of Manufacturing Processes

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Assignment 7
Out 4/4/2008; due Thursday 4/10/2008

Problem 1

Montgomery 12–10

Problem 2

Montgomery 12–15

Problem 3

Suppose that the following results were obtained from a 2-factor experiment with center point. Five replicate measurements were made for each input combination:

x_1	x_2	y (5 replicates)				
0	0	0.1014	0.1056	0.0996	0.0991	0.1038
1	1	0.0650	0.0650	0.0667	0.0662	0.0664
1	−1	0.0914	0.0891	0.0925	0.0855	0.0913
−1	1	0.1107	0.1071	0.1109	0.1115	0.1145
−1	−1	0.1963	0.2185	0.1914	0.1814	0.2092

(a) Attempt to fit a model to these results. Examine the residuals using a normal probability plot and a plot of residuals against fitted values. Do the residuals appear to have equal variance across the prediction range?

(b) Now try fitting models, in turn, to the transformed data sets $\exp(y)$ and $1/y$. In each case examine the residuals and draw conclusions about which, if either, transformation is appropriate.

(These data are also provided in an Excel file on the course website, `7-3.xls'.)

Problem 4

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