Assignment 4

(Due next Friday 09/30/05)

1. A factor with three levels was studied in an experiment. The data is given as follows, in which the first column includes the treatments and the second column includes the responses. You can download the data, homework33.dat, from the class website.

```
1  2.23
1  3.04
.  ...
2  3.65
.. ....
3  8.53
.  ....
3  8.12
```

a). Test the hypothesis that there is no difference across the treatments (use $\alpha = .05$).

b). Use proper plots to check whether the constant variance assumption is valid. Can you use a formal test to support your conclusion?

c). Generate the log s_i vs. log $\bar{y}_i$ plot (trans.sas) and estimate the possible transformation for variance stabilization.

d). Use the formal Box-Cox procedure to identify the optimal transformation. You need use trans1.sas for this data set and generate proper output and plot to make the choice.

e). Repeat a). and b). for the transformed response. You may need use some sas function in the data step to generate the new responses.

2. Four different designs for a digital computer circuit are being studied to compare the amount of defects. The following data have been obtained (defects.dat on the class website):

```
design defect
1   7
1   2
1   4
1   7
1   2
2   10
2   6
2   9
2   7
2   5
3   16
3   13
3   11
3   13
3   13
4   5
4   5
4   2
4   2
4   7
```

a). Is the amount of defects present the same for all four designs? Use $\alpha = 0.05$.

b). Analyze the residuals from a). In particular, how do you think about the normality assumption? Can you use any formal test to support your conclusion?

c). Use the Kruskal-Wallis test for the data and compare the results with a).