Stat 705 Homework 8

Abortion attitudes: Subjects were asked whether they supported the legalization of abortion under three scenarios: (1) the family has very low income and cannot afford more children ($y_{i1} = 1$ supports legalizing abortion, $y_{i1} = 0$ is against), (2) the woman is not married and does not want to marry the man ($y_{i2} = 1, 0$), and (3) the woman wants the abortion for any reason ($y_{i3} = 1, 0$). This is repeated measures data, with three responses taken from each individual. A textfile with the data as one row per outcome, suitable for GLIMMIX, can be found here:

`http://www.stat.sc.edu/~hansont/stat705/abortion.txt`

From left to right is the observation (ignore this), the case i, the reason j, gender (1=male, 2=female), and response y_{ij}. Here is the data in tabular form:

	Number of (y_{i1}, y_{i2}, y_3) equalling							
Gender	$(1,1,1)$	$(1,1,0)$	$(0,1,1)$	$(0,1,0)$	$(1,0,1)$	$(1,0,0)$	$(0,0,1)$	$(0,0,0)$
Male	342	26	6	21	11	32	19	356
Female	440	25	14	18	14	47	22	457

Fit a logistic regression generalized linear mixed model with Bernoulli response y_{ij} in GLIMMIX to determine the effect of `gender` and `reason` for abortion; include a random effect u_i for each of the $n = 1850$ subjects to induce correlation among the (y_{i1}, y_{i2}, y_{i3}). Interpret the model using odds ratios. How does gender affect attitude toward legalizing abortion? How do the three reasons compare? Test $H_0 : \sigma^2 = 0$ using `covtest zerog`.

Enzyme kinetics Consider the data of problem 13.10 (p. 550 in your textbook). Answer 13.10ab (the least squares estimates are the same as the MLE's reported by SAS NLMIXED), 13.11ab (use the Pearson residuals as shown in class), 13.12.

```
data enzyme;
 input velocity conc;
 datalines;
   2.1    1.0    2.5    1.5    4.9    2.0
   5.5    3.0    7.0    4.0    8.4    5.0
   9.6    6.0   10.2    7.5   11.4    8.5
  12.5   10.0   13.1   12.5   14.6   15.0
  17.0   17.5   16.8   20.0   18.6   25.0
  19.7   30.0   21.3   35.0   21.6   40.0
;
proc sgplot; scatter x=conc y=velocity; run;
```

Also, obtain default kernel-smoothed and lowess estimates $\hat{f}(x)$ with confidence intervals for these data in R, as shown in class. You can swipe and paste this into R:

```
v=c(2.1, 2.5,4.9,5.5,7.0,8.4,9.6,10.2,11.4,12.5,13.1,14.6,17.0,16.8,18.6,19.7,21.3,21.6)
c=c(1.0,1.5,2.0,3.0,4.0,5.0,6.0,7.5,8.5,10.0,12.5,15.0,17.5,20.0,25.0,30.0,35.0,40.0)
```