36-707 Homework #6 Due Tuesday Nov 27 15, 2001

Reading

We have been moving through material in RPD in approximately this order:

- Regression diagnostics and case statistics: Ch 11
- Transformations (did already), WLS and GLS: Ch 12, esp. 12.5
- Bootstrap: not in RPD; but see e.g. pp. 142ff. in Venables and Ripley.
- Polynomial regression (Ch 8) and Nonlinear regresion (Ch 15)

Rough plan for rest of semester:

Tue	Thu
Logistic Regression (RPD Sect. 15.5)	Thanksgiving
More Logistic Regression (not in RPD)	Variable Selection (Ch 7)
"Fixing" Collinearity (Ch 2, 13)	Bayesian view of Regression (not in RPD)
More Bayes, or Mixed Effects (maybe Ch 18)	

Exercises:

1. Read RPD sect 12.5, do problem 12.20, p. 430. Unfortunately the data are not on-line in this form, so you will have to type it in.

2. Deblois and Leggett (1991; as reported in Hamilton, 1992) set up experimental aquaria to study dynamics of a simple predator/prey system. They found that rates of predation by amphipods (a small crustacean) were nonlinearly related to the density of their prey, capelin eggs (capelin are small marine fish). For theoretical and empirical reasons the researchers chose a negative exponential model

$$y = \alpha(1 - e^{-\beta x})$$

   for the relation between predation rate (capelin eggs eaten per amphipod) and prey abundance (initial egg density). The data are in "eggs.dat" in the 707 data directory on the web. The variables are:

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density: the initial density of capelin eggs
ratio: predation rate: ratio of number of eggs eaten to number of amphipods
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   Fit the model using `nls()` in Splus. Turn in summaries and graphs similar to the analyses presented in lecture. Briefly describe the fit and (optionally) if you see any way to improve the model or the fit, try it out.