

Hierarchical models

Data

A study was made to investigate how different factors affect the response variable y . Two medium-scale soil preparation techniques are compared. Each technique was used at 8 sites and at each site 3 plots were randomly selected. Measurements were made at 3 trees within each plot. The data set contains the following variables:

treat	Treatment, soil preparation (1, 2)
site	4 sites for each treatment (1,...,8, where 1-4 get treatment 1 and 5-8 get treat 2)
plot	3 plots selected within each site (1,...,3)
tree	3 measurements made within each plot (= 3 trees selected randomly within each plot)
y	Response variable

Compare the two treatments, accounting at the same time for the sampling structure of the data.

The variables are as given above. The data can be found in forest_data.sas or forest.txt.

Repeated measurements

Data

Data come from an experiment studying the level of coronary sinus potassium following coronary occlusion on dogs (Davis 2002 p. 99; Grizzle and Allen, 1969). There were four treatments with nine dogs for each treatment. Measurements were made on each dog 1, 3, 5, 7, 9, 11, 13 minutes after occlusion.

Treat	Treatment number (1- untreated, 2 - cardiac denervation 3 weeks prior, 3- cardiac denervation immediately before, 4 - stellectomy 3 weeks prior)
Dog	Dog number (1—36)
t	Time when measurement was taken (1, 3, 5, 7, 9, 11 or 13 minutes)
y	Potassium level

Analyze these data to find possible treatment differences. Note that the data are of a “repeated measures” type, which means that we have to account for correlation between the different observations within the same dog.

The data can be found in the files dogs_data.sas or dogs.txt.