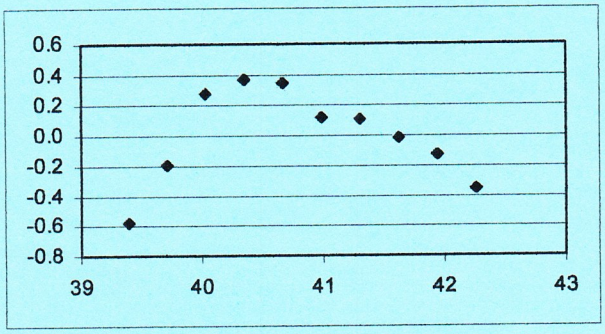
Biology 4605 / 7220
Quiz #5b

Name Key
16 October 2015

1. W.W. Daniel (*Biostatistics*. John Wiley, 1995 p 409) gives data for temperature in laboratory animals (T = deg C) at 10 successive time (t = hours after inoculation).

Using the symbols provided, write a general linear model for the relation of body temperature to time after inoculation by a pathogen, as estimated by linear regression. [5]

$T = B_0 + B_1 \cdot t + \text{error}$

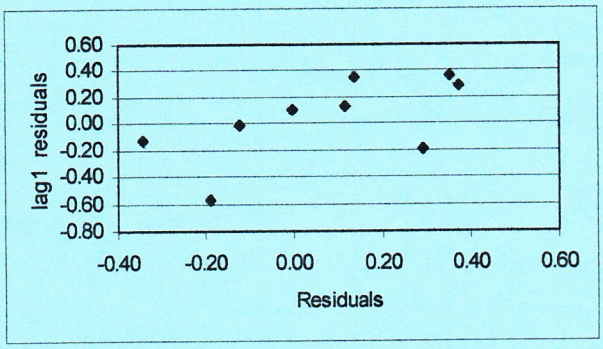


2. Here is a plot of residuals versus fitted values for regression analysis of the body temperature data. Is a straight line model appropriate for this data ?

No [1]

Why or why not? [2]

Clear Arch, straight line not appropriate



Are the residuals independent? No [1]

Why or why not? [2]

Rising trend due to wrong model
Or if "Yes" Weak trend, not important

Comment on the use of this example in a chapter on regression in a text book. [2]

Example clearly not appropriate as example of linear regression.

3. This textbook example asks for the linear regression equation and the F-ratio to test the null hypothesis of no relation. Obtain the F-ratio by completing the ANOVA table [6]

SOURCE	DF	SS	MS	F
Time	1	8.4160	8.416	77.12
Error	8	0.8730	0.109	
Total	9	9.2890		

4. Give a reason why you would (or would not) use this F-ratio to test for a relation between body temperature and time after innoculation. [1]

not use — model misrepresents the relation of temperature trend
use — F based on r^2 (explained variance) of 8.416/9.289