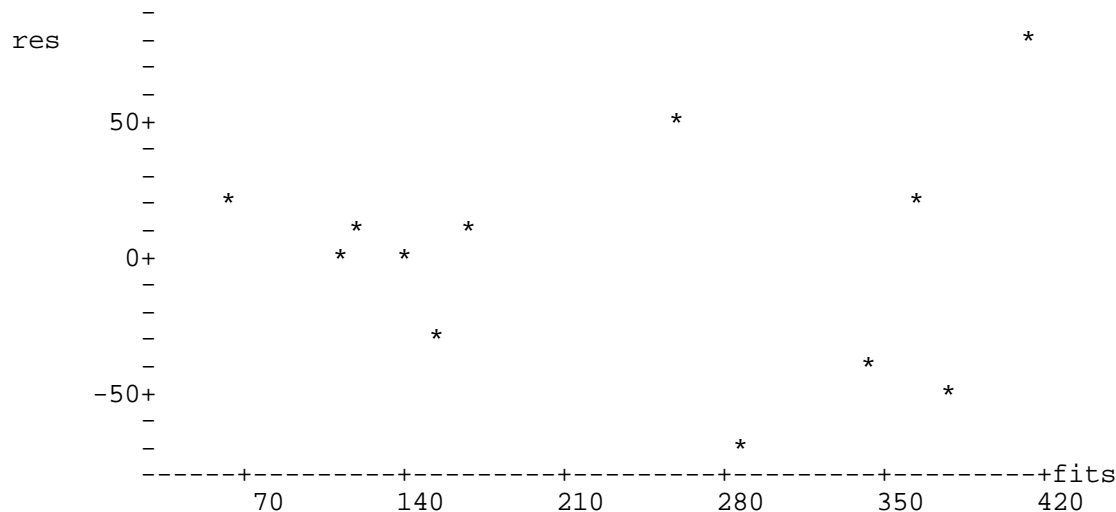


1. W.W. Daniel (*Biostatistics*. John Wiley, 1995 p 408) gives data for mercury in the blood ($Hg_{\text{blood}} = \text{ng/g}$) and mercury intake ($Hg_{\text{intake}} = \text{g Hg /day}$) from fish in 12 people. Here is a plot of residuals versus fitted values for this regression. Comment on whether the assumptions for computing p-values from an F-distribution are met for this data.

MTB > plot c4 c3



Errors not homogeneous, there is a cone opening to the right.
Straight line assumption not met, there is some indication of a bowl.
Note that bowl not evident if the left most point is omitted.
Hence score as correct if 'assumption met' or if 'not met because of bowl'

2. A conservation biologist was interested in energy expenditure of an endangered bird species at low, ambient, and high temperature. Five birds were each held in an environmental chamber on three occasions, allowing energy expenditure (E) to be measured for each bird at each temperature (Tlevel).

2a. Define the explanatory variable, with symbol.

energy expenditure E

Write a general linear model to examine whether energy expenditure depends on temperature. Assume that all five birds have similar base levels of energy expenditure and that all five respond uniformly to temperature.

$$E = \mu_0 + \mu_{\text{Tlevel}} \text{Tlevel} + \epsilon$$

2b. Partition the degrees of freedom and complete the ANOVA table assuming

$SS_{\text{total}} = 100$ and that the model explains 50% of the variability (50% of SS_{total}).

Source	df	SS	MS	F-ratio
Tlevel	2	50	25	6.0
error	12	50	4.167	
Total	14	100		