

STA 303/1002

Pre-exam office hours:

Wed. April 11 10-12,

Mon April 16

10-12,

Wed April 18 3-5

STA 490: Statistical Consultation, Communication, and Collaboration

Jan 2012 - 13:

STA 490 H 1 Y

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Mondays 11-1 (I think)

Residuals from Mixed Models

Can consider data in conditional and marginal sense.

Marginal - interested in quantities averaged over all levels of random effect (subject) (mean of random effect is 0)

Marginal residuals:

$$y_{ijk} - \underbrace{\left(\hat{\beta}_0 + \hat{\beta}_1 x_{ijk,1} + \dots + \hat{\beta}_p x_{ijk,p} \right)}_{\text{fixed effect only}}$$

Conditional - interested in quantities for ^{each} particular subject

Conditional residuals

$$y_{ijk} - \underbrace{\left(\hat{\beta}_0 + \hat{\beta}_1 x_{ijk,1} + \dots + \hat{\beta}_p x_{ijk,p} + \hat{u}_{ij} \right)}_{\text{conditional mean of } y \text{ given } u}$$

In mixed models can model different groups of observations to have different variances so look at the standardized residuals to adjust for this

Which residual to use when:

Studentized

- Marginal residuals : For continuous explanatory variables, plot marginal residuals vs. predicted variables to investigate if linear model is appropriate

If model is ^{of} correct form, expect random scatter about 0

- Studentized conditional residuals - check for outliers and normality

For dist - diagraphs example: Residuals have a

right-skewed distribution.
- no sensory outliers

Log transformation fixes this problem

Part 1 est. from generalized least squares are robust against non-normality (GLS), so inferences are the same for analysis we did as for analysis on log-transformed data.

There exist LOTS of other covariance structures.

eg. AR(1)