Heteroscedasticity

Note

- GLS – we minimize a weighted sum of residual squares with $w_i = \frac{1}{\sigma^2}$ acting a the weights

- OLS – we minimize an unweighted equally weighted residual sum of squares (RSS)

- In GLS the weight assigned to each observation is inversely proportional to its σ_i, that is, observations coming from
  - a population with larger σ_i will get relatively smaller weight
  - and those from a population with small σ_i will get proportionately larger weight in minimizing the RSS

- In the (unweighted) OLS, each $\hat{u}_i$ associated with points A, B, and C will receive the same weight in minimizing the RSS. The ${\hat{u}_i}^2$ associated with point C will dominate the RSS

- In GLS the extreme observation C will get relatively smaller weight than the other two observations

- In estimating the PRF more reliably we would like to give more weight to observations that are closely clustered around their (population) mean than to those that are widely scattered about