STAT/BIOST 571: Homework 4

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Problem 1: Iterative methods for solving GEE (10 points)

In this problem, you will compare variants on GEE (or general linear model) estimation procedures when applied to the example dental data set for the model on slide 2.71. Throughout, use a homoscedastic AR-1 working covariance matrix and estimate α and σ^2 using moment-based estimators. For each procedure, compute point estimates and robust sandwich-based standard errors that account for clustering. Where applicable, report how many interations are required to get convergence of all estimates ($\boldsymbol{\beta}$, α, and σ^2) in their 1st/2nd/3rd significant figures.

(a) Use the non-iterative procedure we have employed previously; that is, first estimate $\boldsymbol{\beta}$ by OLS, then estimate the covariance parameters based on residuals from the OLS fit, and then restimate $\boldsymbol{\beta}$ using the updated working covariance matrix.

(b) Iterate the procedure in part (a), as suggested on slide 2.44.