Correlated Data Analysis: Modeling, Analytics and Applications

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Problem Set 4

Problem 4.1 This problem concerns the simulation of correlated data with given margins and correlation structures. The marginal model is given by

$$g(\mu) = 1.0 + 0.5 * t,\ t = -4, \ldots, 4,$$

and the correlation structure may be taken as Independence, Interchangeable, AR-1 or 1-dependence with the correlation parameter $\gamma = 0.5$.
(a) Write an R code to simulate a set of correlated normal data, with $K = 100$, variance $\sigma^2 = 1$ and the link function equal to the identity link.
(b) Write an R code to simulate a set of correlated Poisson data, with $K = 100$ and the link function $g = \log$.
(c) Write an R code to simulate a set of correlated binary data, with $K = 100$ and the link function $g = \text{logit}$.

Problem 4.2 Write an R function to calculate the sample lorelogram of the Indonesian Children's Health Study data introduced in Section 1.3.1. The data can be downloaded from webpage

`http://www.stats.uwaterloo.ca/~song/BOOKLDA.html`

Does the plot indicate any patterns for the association? Comments.