Midterm — Etna Volcano Interevent Times

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Abstract

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KEY WORDS: Hierarchical Bayesian models, auxiliary Gibbs sampling, data augmentation, t-distribution.

1. Introduction

2. Methods

The proposed model is

$$\begin{array}{rcrcll} \log T_i & = & \mu_i & + & \epsilon_i, & \epsilon_i \sim St_\nu(0,\sigma^2) \\ \mu_i & = & \mu & + & \nu_i, & \nu_i \sim N(0,\tau^2). \end{array}$$

The full conditional for the parameters (e.g. mu_i) in this model are not all available in closed form. And while standard MCMC methods (e.g. metropolis-hastings) can be used to sample from the joint posterior of the parameters, we can simplyfy computation by introducing auxiliary variables λ_i for each observation and sample from the posterior using only Gibbs. The augmentation is outline as follows:

$$\begin{array}{rcccl} \log T_i & \mid & \lambda_i & \sim & N(\mu_i, (\sigma/\sqrt{\lambda_i})^2) \\ & & \lambda_i & \sim & \text{Gamma}(\nu/2, \nu/2) \end{array}$$

3. Analysis

4. Conclusions

REFERENCES

Gelman, A., Carlin, J. B., Stern, H. S., & Rubin, D. B. (2014). Bayesian data analysis (Vol. 2). Boca Raton, FL, USA: Chapman & Hall/CRC, 73.