

DSS Statistics Seminar

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<https://meet.google.com/tby-effo-ont>

Bayesian robust small area
estimation with symmetric
 α -stable distribution

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Outlying observations in area level random effect models can cause poor performance in small area estimation (SAE). Several approaches have been proposed in literature based on specification of flexible prior distributions for the random effects. In this work, we propose the symmetric α -stable (S α S) distribution to deal with outliers in random effects. The S α S distribution is a generalization of the Gaussian distribution having one additional parameter $\alpha \in (0,2]$ governing the tail behaviour. We estimate the model in a fully Bayesian framework: since neither closed-form expression for the joint posterior distribution can be derived nor full conditional distribution can be computed, we involve Metropolis-Hastings within Gibbs sampling algorithm and rejection sampling for the joint estimation of the model parameters. We show according to different simulation scenarios the performance of the proposed model and compare it with existing methods according to several diagnostic measures. We conclude that our approach has a significant impact especially when data are characterized by the presence of extreme outliers. We also apply the proposed model to real data.



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