EBLUP estimation of small area totals for unit-level panel data

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The EBLUP estimation (see e.g. Rao, 2003) is one of the most common approaches to estimation of small area totals or means. In the EURAREA research project (The EURAREA consortium, 2004) an EBLUP estimator as well as estimator of its mean squared error was derived for the case, where unit-level data from previous time points were available for each area to be utilized in the estimation of current small area totals by appropriate mixed models. However, these models, with possibly autocorrelated area-level random effects, were defined only for the non-panel case, where different units were observed at different time points.

The purpose of this work is to adjust the EBLUP estimator for the case of panel or rotated panel survey data, where there are short time series available for each unit. In the underlying model the unit-level error terms are assumed to follow the AR(1) covariance structure. The performance of the estimator is illustrated with an application to Finnish survey data.

References

Rao, J.N.K. (2003). *Small Area Estimation*. Wiley, New York.

The EURAREA consortium (2004). *Project Reference Volume D7.1.4*.

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