multiplicity adjusted posterior probabilities for the models, which we use in a structured algorithm to decide whether to report a subgroup effect, ind, if so, which. Frequentist operating characteristics of the approach are evaluated using simulation, and the approach is used in real data example. While our approach is applicable in general cases, we mainly focus on the case of 2 covariates each at 2 levels for ease of presentation.

Keywords: Anova models; Multiplicity adjustment.

Bayesian estimation of linear regression model with unknown prior and noise covariance matrix

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ABSTRACT. The problem of determination of a source of atmospheric release of pollutant can be formalized as a linear regression problem, y = Mx+e, with two specific features. First, the matrix M is poorly conditioned which require to define prior on the unknown source, x. Second, the covariance matrix of the measurement noise, cov(e) is typically unknown. In this contribution, we study structures of hierarchical priors that could be used to improve estimates of the parameter of interest, x. Inference of all unknowns from the available measurement is not feasible. Therefore, several restrictive parameterizations of the priors are proposed and approximate inference methods are derived for each of them. Specifically, we design models of the measurement covariance matrix with diagonal and block diagonal unknown elements, and with parametric form taking into account possible temporal and spacial correlations. The prior model for x is designed to promote sparse solution, using zero-mean prior with unknown variance. Parameter inference is derived using variational methods and Gibbs sampling. Different variants of the models are them compared using standard model selection techniques on real data from the European tracer experiment.

Keywords: Covariance estimation; Linear regression; Model selection.

Moment conditions and Bayesian nonparametrics

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ABSTRACT. Models phrased though moment conditions are central to much of modern inference. Here these moment conditions are embedded within a nonparametric Bayesian setup. Handling such a model is not probabilistically straightforward as the posterior has support on a manifold. We solve the relevant issues, building new probability and computational tools using Hausdorff measures to