

## **Label Switching in Bayesian Mixture Models: deterministic relabeling strategies.**

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Label switching is a well known problem in the Bayesian analysis of mixture models. On the one hand, it complicates inference and on the other hand it has been perceived as a prerequisite to justify MCMC convergence. As a result, non-standard MCMC algorithms that traverse the symmetric copies of the posterior distribution, and possibly genuine modes, have been proposed. To perform component specific inference, methods to undo the label switching and recover the interpretation of the components, need to be applied. If latent allocations for the design of the MCMC strategy are included, and the sampler has converged, then labels assigned to each component may change from iteration to iteration. However, observations being allocated together must remain similar, and we use this fundamental fact to derive an easy and efficient solution to the label switching problem. We compare our strategy with other relabeling algorithms on univariate and multivariate data examples and demonstrate improvements over alternative strategies.