

# An approximation to the information matrix of exponential family finite mixtures

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**Abstract** A simple closed form of the Fisher information matrix (FIM) usually cannot be obtained under a finite mixture. Several authors have considered a block-diagonal FIM approximation for binomial and multinomial finite mixtures, used in scoring and in demonstrating relative efficiency of proposed estimators. Raim et al. (Stat Methodol 18:115–130, 2014a) noted that this approximation coincides with the complete data FIM of the observed data and latent mixing process jointly. It can, therefore, be formulated for a wide variety of missing data problems. Multinomial mixtures feature a number of trials, which, when taken to infinity, result in the FIM and approximation becoming arbitrarily close. This work considers a clustered sampling scheme which allows the convergence result to be extended significantly to the class of exponential family finite mixtures. A series of examples demonstrate the convergence result and suggest that it can be further generalized.

**Keywords** Fisher information · Complete data · Clustered sampling · Misclassification rate

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