Statistics > Methodology

Sequential Monte Carlo EM for multivariate probit models

Giusi Moffa, Jack Kuipers

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A Monte Carlo EM algorithm is considered for the maximum likelihood estimation of multivariate probit models. To sample from truncated multivariate normals we introduce a sequential Monte Carlo approach, while to improve the efficiency in driving the sample particles to the truncation region Student t distributions are invoked before taking their limit to a normal. After the initial sampling, a sequential Monte Carlo step can be performed to shift to new parameter values, recycling the samples and so reducing the computational cost. We discuss the identifiability issue and show that the invariance of the likelihood provides the means to ensure that constrained and unconstrained maximization are equivalent. Finally, for the multivariate probit model we derive a simple iterative procedure for either maximization which takes effectively no computational time. Applying our method to the widely used Six Cities dataset we find parameters which improve the maximum likelihood compared to other approaches.

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