1057-62-433   **Mathias Drton** (`drton@uchicago.edu`), 5734 S University Ave, Chicago, IL 60637, and **Han Xiao*** (`xiao@galton.uchicago.edu`), 5734 S University Ave, Chicago, IL 60637. *Smoothness of Gaussian conditional independence models.*

Conditional independence in a multivariate normal (or Gaussian) distribution is characterized by the vanishing of sub-determinants of the distribution's covariance matrix. Gaussian conditional independence models thus correspond to algebraic subsets of the cone of positive definite matrices. For statistical inference in such models it is important to know whether or not the model contains singularities. We study this issue in models involving up to four random variables. In particular, we give examples of conditional independence relations which, despite being probabilistically representable, yield models that non-trivially decompose into a finite union of several smooth submodels. (Received January 26, 2010)