1035-14-255   **Mathias Drton**, **Bernd Sturmfels** and **Seth Sullivant*** (`seths@math.harvard.edu`),
Department of Mathematics, Science Center, One Oxford St, Cambridge, MA 02138. *Algebraic factor analysis.*

Factor analysis refers to a statistical model in which observed variables are conditionally independent given fewer hidden variables, known as factors, and all the random variables follow a multivariate normal distribution. The parameter space of a factor analysis model is a subset of the cone of positive definite matrices. This parameter space is studied from the perspective of computational algebraic geometry. Gröbner bases and resultants are applied to compute the ideal of all polynomial functions that vanish on the parameter space. These polynomials, known as model invariants, arise from rank conditions on a symmetric matrix under elimination of the diagonal entries of the matrix. Besides revealing the geometry of the factor analysis model, the model invariants also furnish useful statistics for testing goodness-of-fit. (Received August 24, 2007)