1067-05-846   **Maria Angelica Cueto**, **Enrique A. Tobis** and **Josephine Yu***, Georgia Tech, School of Mathematics, 686 Cherry St, Atlanta, GA 30332. *An Implicitization Challenge for Binary Factor Analysis.*

We use tropical geometry to compute the multidegree and Newton polytope of the hypersurface of a statistical model with two hidden and four observed binary random variables, solving an open question stated by Drton, Sturmfels and Sullivant in their book *Lectures on Algebraic Statistics* (Problem 7.7). The model is obtained from the undirected graphical model of the complete bipartite graph $K_{2,4}$ by marginalizing two of the six binary random variables. We present algorithms for computing the Newton polytope of its defining equation by parallel walks along the polytope and its normal fan. In this way we compute vertices of the polytope. Finally, we also compute and certify its facets by studying tangent cones of the polytope at the symmetry classes vertices. The Newton polytope has 17214912 vertices in 44938 symmetry classes and 70646 facets in 246 symmetry classes. (Received September 15, 2010)