

Meeting: 1000, Albuquerque, New Mexico, SS 3A, Special Session on Algebraic Geometry

1000-14-185 **Fabrizio Catanese** and **Serkan Hosten*** (serkan@math.sfsu.edu), San Francisco State University, Mathematics Department, 1600 Holloway Avenue, San Francisco, CA 94132, and **Amit Khetan** and **Bernd Sturmfels**. *The maximum likelihood degree and the likelihood equations.*

Maximum likelihood estimation is a nonlinear optimization problem that arises in statistics. One way to find a global optimal solution is to solve the critical equations. The maximum likelihood (ML) degree is the number of complex solutions to these critical equations. First, we give formulas for the ML degree in the dense and sparse cases: we show that the ML degree is equal to the degree of the top Chern class of a sheaf of logarithmic differential one-forms. We also show that under mild hypotheses the ML degree is equal to the Euler characteristic of the complement of a hypersurface arrangement. Furthermore, we give algorithms that compute the critical ideal whose roots are the solutions to the critical equations. (Received August 24, 2004)