1145-VT-1049   **Grant L Innerst*** (`grant_innerst@baylor.edu`), 1816B S 12th St., Waco, TX 76706, and **David J Kahle** (`david_kahle@baylor.edu`). *An Algebraic Approach to Minimum Chi-Square Estimation.* Preliminary report.

The field of algebraic statistics arose from the realization that many statistical questions exhibit an algebraic structure. Leveraging this algebraic structure allows for the use algebraic theory and powerful, often niche, software from the algebraic community to find solutions which were previous unattainable. Minimum chi-square estimation, a statistical estimation paradigm alternative to maximum likelihood estimation, exhibits such an algebraic structure. The computation of a minimum chi-square estimator involves an optimization problem with rich algebraic structure: a rational objective function over an algebraic feasibility region. This structure can be exploited with tools from the algebraic geometry community. Bertini, a highly specialized, state-of-the-art software package for nonlinear algebra, is designed to determine the solution sets of systems of nonlinear polynomial equations. Preliminary results show that the implementation of this estimation technique using algebraic methods yields expected results while providing enhanced reliability and adding the ability to solve more complicated problems. (Received September 18, 2018)