Meeting: 1003, Atlanta, Georgia, AMS CP 1, AMS Contributed Paper Session

1003-65-1613 **Hongbin Guo*** (hb_guo@asu.edu), Department of Mathematics and Statistics, Arizona State University, Tempe, AZ 85287-1804, and **Rosemary A Renaut**. *Iterative Method for Regularized Total Least Squares.*

We consider the solution of the linear system, $Ax \approx b$, where $A \in R^{m\times n}$ and $b \in R^m$ are known, and are assumed to be error-contaminated. One method to model this problem is total least squares (TLS). Tikhonov-like regularized total least squares (RTLS) methods was introduced by Golub, Hansen and O'Leary in 1999 for the ill-posed case. And Sima, Van Huffel and Golub, 2003, presented a technique for solution of RTLS based on a quadratic eigenvalue problem, (RTLSQEP). Guo and Renaut, 2002, derived an eigenproblem for the RTLS which can be solved using the iterative inverse power method. Here we present an alternative derivation of the eigenproblem for constrained TLS through the augmented Lagrangian for the constrained normalized residual. This extends the analysis of the eigenproblem and leads to derivation of more efficient algorithms compared to the original formulation. Additional algorithms based on bisection search and a standard L-curve approach are presented. These algorithms vary with respect to the parameters that need to be prescribed. Numerical and convergence results supporting the different versions and contrasting with RTLSQEP are presented. (Received October 05, 2004)