1125-00-1595 **Elaheh Gorgin*** (elaheh.gorgin@minotstateu.edu). *Numerical Treatment of Ill-posed Linear Systems.* Preliminary report.

Inverse problems arise in many branches of science and engineering including statistics, geophysics, remote sensing, astronomy, physics, weather predictions, and many other fields. An equation Ax = b in which the matrix A is generally very ill-conditioned and the data b is not exact, represents an ill-posed problem. This kind of problems are essentially under-determined due to the cluster of small singular values. The computed solution is potentially very sensitive to perturbations of the data. In such a case, it is essential to use numerical regularization theory to provide efficient and numerically stable methods that lead to useful stabilized solutions. Tikhonov regularization is one of the most popular regularization method for estimating the solutions of ill-posed problems and a significant drawback for this method is the need to choose the regularization parameter.

In this work, we summarize two known parameter choice techniques, the L-curve method and the multiplicative regularization method, and also we introduce a new parameter choice strategy. We go over the science and the theory behind these methods, compare their performances on fourteen different test problems for various noise levels, and discuss some of the applications. (Received September 18, 2016)