1131-65-394 **Gul Karaduman*** (gul.karaduman@mavs.uta.edu) and **Ren Cang Li**. *Iterative Solution of Saddle Point Problems by LSMR.* Preliminary report.

Wide variety of applications in computational science and engineering give rise to the non-symmetric saddle point problems of the form

$$\begin{bmatrix} A & B^T \\ B & 0 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} f \\ 0 \end{bmatrix}$$

where $A \in R^{n\times n}$, $B \in R^{m\times n}$ has a full column rank with $n \geq m$ and $f \in R^n$. This system can also be written as two linear systems $Ax + B^T y = f$, $Bx = 0$. In our work, we use a projection matrix Q to write the solution vector $x \in R^n$ as $x = Qz$, where $z \in R^n$, to transform the problem to a least squares problem. Least Square Minimal Residual Method(LSMR) is used to solve the least the system. Numerical experiments with matrices from various application areas show the potential of this approach. (Received July 18, 2017)