1067-65-2366 **Abdramane Serme*** (aserme@bmcc.cuny.edu), BMCC/CUNY-The City University of New York, Department of mathematics, N770, New York, NY 10007, and **Jean W. Richard** (jrichard@bmcc.cuny.edu), BMCC/CUNY-The City University of New York, Department of mathematics, N524, New York, NY 10007. *On the convergence of iterative refinement/improvement of the solution to an ill conditioned linear system.*

This talk is about improving the solution $x = A^{-1}b$ to an ill conditioned linear system $Ax = b$. We extend the classical the iterative refinement/improvement algorithm to the matrix equation $CW = U$ and compute $W = C^{-1}U$ in $I_r - V^H C^{-1}U$ using the following algorithm.

$$\begin{aligned} W_i &\leftarrow fl(C^{-1}U_i) = C^{-1}U_i - E_i \\ U_{i+1} &\leftarrow U_i - CW_i \end{aligned}$$

for $i = 0, 1, \ldots, k$, $U = U_0$ and $C(W_0 + \cdots + W_k) = U - CE_k$.we proved that if $\frac{||C^{-1}F_k||}{1-||C^{-1}F_k||} < 1$, where $F_k = C_k - C$, $X_k = W_0 + ... + W_k$ and $X = W$, then $||X_k - X|| \leq \mathcal{O}(\bar{u})$. By applying forward error analysis, we proved that $\frac{||X_k - X||}{||X||} \leq \mathcal{O}(u)$, and by applying backward error analysis we proved that $\lim_{k \longrightarrow \infty} \frac{||U_k - CW_k||}{||C||||W_k||} = \frac{4c_1(k)}{1-c_1'(k)cond_2 Cu}\bar{u}$, where $c_1(k)$ and $c_1'(k)$ are linear functions in k. In this talk we show how we improve the bound $\frac{4c_1(k)}{1-c_1'(k)cond_2 Cu}\bar{u}$ and use it to prove the convergence of the error matrix $-E_k$ to zero as $k \longrightarrow \infty$ in the equation $C(W_0 + \cdots + W_k) = U - CE_k$. (Received September 22, 2010)