TO FIND $\bar{y}^1$ FROM $\bar{y}^0$:

$$\bar{y}^1 = \bar{y}^0 + \alpha_0 \frac{\bar{d}_y^0}{\|d_y^0\|}$$

$$\bar{d}_y^0 = -\bar{P}_0 \bar{X}_0 \bar{c}$$

where $\bar{P}_k = \left[\bar{I} - \bar{X}_k \bar{A}^T (\bar{A} \bar{X}_k^2 \bar{A}^T)^{-1} \bar{A} \bar{X}_k\right]$

$$\bar{I} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \qquad \bar{X}_0 = \begin{bmatrix} 10 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 7 & 0 \\ 0 & 0 & 0 & 13 \end{bmatrix}$$

$$\bar{A} = \begin{bmatrix} 1 & -1 & 1 & 0 \\ 0 & 1 & 0 & 1 \end{bmatrix} \qquad \bar{c} = \begin{bmatrix} -2 \\ 1 \\ 0 \\ 0 \end{bmatrix}$$

$$\therefore \; P_0 = \begin{bmatrix} .3460 & .1278 & -.4578 & -.0197 \\ .1278 & .9519 & .0894 & -.1464 \\ -.4578 & .0894 & .6795 & -.0138 \\ -.0197 & -.1464 & -.0138 & .0225 \end{bmatrix}$$

$$\bar{d}_y^0 = \begin{bmatrix} 6.6647 \\ 0.6516 \\ -9.3347 \\ -0.1003 \end{bmatrix}$$

$$\|\bar{d}_y^{\,0}\| = \sqrt{(6.6647)^2 + (.6516)^2 + (-9.3347)^2 + (-.1003)^2} = 11.48$$

letting $\alpha = .95$

$$\bar{y}' = \bar{y}^{\,0} + \alpha_0 \frac{\bar{d}_y^{\,0}}{\|\bar{d}_y^{\,0}\|}$$

$$\bar{y}' = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix} + \frac{.95}{11.48} \begin{bmatrix} 6.66 \\ .68 \\ -9.33 \\ -0.10 \end{bmatrix} = \begin{bmatrix} 1.55 \\ 1.056 \\ .226 \\ .99 \end{bmatrix}$$

TRANSFORM BACK

$$\bar{X}' = X_0 \bar{y}' = \begin{bmatrix} 10 & 0 & 0 & 0 \\ 0 & 2 & 0 & 0 \\ 0 & 0 & 7 & 0 \\ 0 & 0 & 0 & 13 \end{bmatrix} \begin{bmatrix} 1.55 \\ 1.056 \\ .226 \\ .99 \end{bmatrix} = \begin{matrix} 15.5 \\ 2.10 \\ 1.58 \\ 12.87 \end{matrix}$$