Stat776 **HW11** **not to be collected**

1. Data file ex.txt contains y1, y2, x1, x2, x3 and x4.

   Find the first principal component for $\mathbf{z}$, the standardized $\mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$.

2. For data in 1, let prin1 and prin2 be the first two principal components for $\mathbf{z}$, the standardized $\mathbf{x} = \begin{pmatrix} x_1 \\ x_2 \\ x_3 \end{pmatrix}$. Test the usefulness of the model $\begin{pmatrix} y_1 \\ y_2 \end{pmatrix} = \beta_0 + \beta_1(\text{prin1}) + \beta_2(\text{prin2}) + \epsilon$.