MEEG 4703 Quiz #5

1. (10 points) Define the matrices: (*a*) identity matrix **I**, (*b*) singular matrix **A**, (*c*) spectral matrix **S**, (*d*) modal matrix **M**, (*e*) orthogonal matrix **P**.

2. (20 points) Using orthogonal matrix and diagonalization, **identify** and **graph** (to scale) the conic section

$$9x^2 + 24xy + 16y^2 - 4x + 3y = 0$$

Answers:

2. It is a parabola.

$\lambda_1 = 0, \quad \lambda_2 = 25$

$$\mathbf{P} = \frac{1}{5}\begin{bmatrix} 4 & 3 \\ -3 & 4 \end{bmatrix}$$

$$\mathbf{R} = \mathbf{P}^T = \frac{1}{5}\begin{bmatrix} 4 & -3 \\ 3 & 4 \end{bmatrix}$$

$5Y^2 - X = 0$: