

## MEEG 4703 [Quiz m5.073](#)

- (10 points) Define the matrices: (a) identity matrix  $\mathbf{I}$ , (b) singular matrix  $\mathbf{A}$ , (c) spectral matrix  $\mathbf{S}$ , (d) modal matrix  $\mathbf{M}$ , (e) orthogonal matrix  $\mathbf{P}$ .
- (10 points) Using orthogonal matrix and diagonalization, **identify** and **graph** (to scale) the conic section

$$16x^2 + 24xy + 9y^2 - 3x + 4y = 10$$


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2.  $\lambda_1 = 0, \lambda_2 = 25$

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

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

$$\lambda_1 X^2 + \lambda_2 Y^2 + \mathbf{B} \mathbf{X} = k$$

$$25Y^2 - 5X = 10$$

$$5Y^2 = X + 2$$

It is a parabola.

