1. Given a unit vector **v** $(0^o < \theta < 360^o)$, please find the local maximum or minimum of Rayleigh quotient for

$$\lambda = \frac{\mathbf{v}^T C \mathbf{v}}{\mathbf{v}^T \mathbf{v}}$$

where $C = F^T F$ and

$$F = \begin{bmatrix} 1 & 2/\sqrt{3} & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

2. Find the variational problem for

$$\frac{\delta \lambda}{\delta \mathbf{v}} = 0$$

3. Find the eigensystem for

$$C\mathbf{v} = \lambda \mathbf{v}$$

4. Find the SVD for C.

$$C = \Phi \Sigma \Psi^T$$

5. Please comments **1,2,3** and **4**.