11.03**

söndag 3 mars 2024 23:07

$$K = \begin{pmatrix} 1 & 2 \\ 2 & -2 \end{pmatrix} \qquad x_1^2 + x_2^2 = 1$$

$$\det(\lambda I - K) = \begin{vmatrix} \lambda - 1 & -2 \\ -2 & \lambda + 2 \end{vmatrix} = (\lambda - 1)(\lambda + 2) - 4 =$$

$$= \lambda^2 + \lambda - 6 = 0 \qquad \lambda_1 = 2 \quad \lambda_2 = -3$$

$$S_1 = t_1 \begin{pmatrix} 2 \\ 1 \end{pmatrix} \qquad S_2 = t_2 \begin{pmatrix} 1 \\ -2 \end{pmatrix} \qquad Q = \frac{1}{\sqrt{5}} \begin{pmatrix} 2 & 1 \\ 1 & -2 \end{pmatrix}$$

$$x_1^2 + x_2^2 = x^T x = (Q\hat{x})^T \cdot Q\hat{x} = \hat{x}^T Q^T Q \cdot \hat{x} = \hat{x}^T \hat{x} = \hat{x}_1^2 + \hat{x}_2^2 =$$

$$= 1$$

$$\max_{x_1^2 + x_2^2 = 1} (x_1^2 + 4x_1x_2 - 2x_2^2) = \max_{\hat{x}_1^2 + \hat{x}_2^2 = 1} (2\hat{x}_1^2 - 3\hat{x}_2^2)$$

maximum då $\hat{x}_1 = \pm 1$ & $\hat{x}_2 = 0 \Rightarrow 2$

minimum då $\hat{x}_1 = 0$ & $\hat{x}_2 = \pm 1 \Rightarrow -3$