

Ans 2)

$$(x_1, x_2, x_3, x_4, x_5, x_6)$$

$$x_1 + 2x_2$$

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$$x_3 + 2x_4$$

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$$x_5 + 2x_6$$

$$x_1 + 2x_2 = x_3 + 2x_4$$

$$x_1 + 2x_2 = x_5 + 2x_6$$

$$x_3 + 2x_4 = x_5 + 2x_6$$

$$x_1 + 2x_2 - x_3 - 2x_4 = 0$$

$$x_1 + 2x_2 - x_5 - 2x_6 = 0$$

$$x_3 + 2x_4 - x_5 - 2x_6 = 0$$

$$\sim 1 \left[ \begin{array}{cccccc} 1 & 2 & -1 & -2 & 0 & 0 \\ 1 & 2 & 0 & 0 & -1 & -2 \\ 0 & 0 & 1 & 2 & -1 & -6 \end{array} \right]$$

$$\sim 1 \left[ \begin{array}{cccccc} 1 & 2 & -1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 2 & -1 & -2 \\ 0 & 0 & 1 & 2 & -1 & -6 \end{array} \right]$$

A · x = 0

$$\left[ \begin{array}{cccccc} 1 & 2 & -1 & -2 & 0 & 0 \\ 0 & 0 & 1 & 2 & -1 & -2 \\ 0 & 0 & 0 & 0 & 0 & -4 \end{array} \right]$$

$$-4x_6 = 0$$

$$x_6 = 0$$

$$x_3 + 2x_4 - x_5 = 0 \quad \Leftrightarrow x_3 = x_5 - 2x_4$$

$$x_1 + 2x_2 - x_3 - 2x_4 = 0$$

$$x_1 + 2x_2 - x_5 + \cancel{2x_4} - \cancel{2x_4} = 0$$

$$\Leftrightarrow x_1 = -2x_2 + x_5$$

$$(x_1, x_2, x_3, x_4, x_5, x_6) =$$

$$(-2x_2 + x_5, x_2, x_5 - 2x_4, x_4, x_5, 0)$$

$$= (-2x_2, x_2, 0, 0, 0, 0) + (x_5, 0, x_5, 0, x_5, 0) + (0, 0, -2x_4, x_4, 0, 0) =$$

$$x_2 (-2, 1, 0, 0, 0, 0) + x_5 (1, 0, 1, 0, 1, 0)$$

$$x_4 (0, 0, -2, 1, 0, 0)$$

$$A \cdot \vec{x} = 0$$

για διαφόρους λόγους/επαι.

$$\langle (-2, 1, 0, 0, 0, 0), (1, 0, 1, 0, 1, 0), (0, 0, -2, 1, 0, 0) \rangle$$

χωρίς βέβαια

$$\begin{bmatrix} 1 & -1 \\ 1 & 0 \\ 0 & 1 \end{bmatrix}$$

$A_{6K} \textcircled{4}$

$$E_{OLW} = A_{3 \times 3}$$

$$\begin{bmatrix} 3 & 4 & 5 \\ 5 & 6 & 7 \\ 7 & 8 & 9 \end{bmatrix}$$

$$\begin{array}{cccccc} & + & + & - & - & - \\ 3 & 4 & 5 & 1 & 3 & 4 \\ 5 & 6 & 7 & 1 & 5 & 6 \\ 7 & 8 & 9 & 1 & 7 & 8 \end{array}$$

$$\det A = 3 \cdot 6 \cdot 9 + 4 \cdot 7 \cdot 7 + 5 \cdot 5 \cdot 8 - 4 \cdot 5 \cdot 9 - 3 \cdot 7 \cdot 8 - 5 \cdot 6 \cdot 7$$

$$192 + 196 + 200 - 180 - 168 - 210$$

$$588 - 558 = 30$$

~~8~~ ~~4~~

~~8~~ ~~6~~



Agk (5)

$$\phi_k = 5\phi_{k-1} - 6\phi_{k-2}$$

$$\phi_0 = 2, \quad \phi_1 = 5$$

$$\phi_{k-1} = \phi_{k-1}$$

$$u_{k-1} = \begin{bmatrix} 5 & -6 \\ 1 & 0 \end{bmatrix} u_{k-2}$$

$$A = \begin{bmatrix} 5 & -6 \\ 1 & 0 \end{bmatrix}$$

$$\begin{vmatrix} 5-\lambda & -6 \\ 1 & -\lambda \end{vmatrix} = 0$$

$$\Leftrightarrow -\lambda(5-\lambda) + 6 = 0$$

$$\lambda^2 - 5\lambda + 6 = 0$$

$$\lambda = 2, \quad \lambda = 3 \quad \text{ιδιοτιμές}$$

A 6k 6

$4xy + 4xy$

"

$$f(x, y) = -2x^2 + 8xy - 10y^2$$

$$A = \begin{bmatrix} -2 & 4 \\ 4 & -10 \end{bmatrix} \quad \begin{matrix} xx & xy \\ yx & yy \end{matrix}$$

$$z^T A z =$$

$$= \underset{1 \times 2}{[x, y]} \underset{2 \times 2}{\begin{bmatrix} -2 & 4 \\ 4 & -10 \end{bmatrix}} \underset{2 \times 1}{\begin{bmatrix} x \\ y \end{bmatrix}}$$

$$[-2x + 4y \quad 4x - 10y] \begin{bmatrix} x \\ y \end{bmatrix} =$$

$$= -2x^2 + 4xy + 4xy - 10y^2 =$$

$$-2x^2 + 8xy - 10y^2$$

$$\begin{bmatrix} -2 & 4 \\ 4 & -10 \end{bmatrix}$$

$$\begin{vmatrix} -2-\lambda & 4 \\ 4 & -10-\lambda \end{vmatrix} = 0 \Leftrightarrow$$

$$\begin{pmatrix} 3 & -6 \\ 1 & -2 \end{pmatrix} \begin{pmatrix} v_1 \\ v_2 \end{pmatrix} = \begin{pmatrix} 0 \\ 0 \end{pmatrix}.$$

$$3v_1 - 6v_2 = 0 \quad \Leftrightarrow v_1 = 2v_2$$

$$v_1 - 2v_2 = 0 \quad \Leftrightarrow v_1 = 2v_2$$

$$(v_1, v_2) = (2v_2, v_2) = v_2 (2, 1)$$

$$\phi = S \wedge S^{-1} \phi_0$$