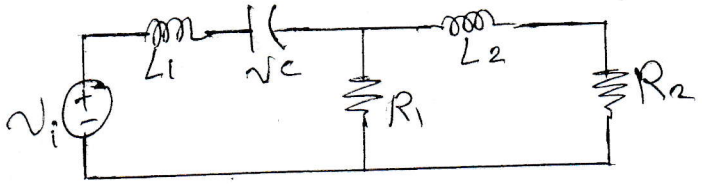
Exam (1) Engineering analysis ( Matrices ) Dr. Lafta AlQaisy

Q1: For the matrix $P^{-1} = \begin{bmatrix} 1 & 0 & 0 \\ -2 & 1 & 0 \\ 4 & -4 & 1 \end{bmatrix}$, Find ;

(1) The matrix A if it is Jordan Canonical form.

(2) The Matrix $\Lambda$ .

Q2 : Find the state equation for $i_1(t)$ , $i_2(t)$ *and* $v_c(t)$ for Figure below




Q3: check the matrices below if it is Symmetric , Skew – Symmetric or Orthogonal. $A = \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 0 \\ -1 & 0 & 0 \end{bmatrix}$ and $A = \begin{bmatrix} 2 & 8 \\ -8 & 2 \end{bmatrix}$

Q4: what kind of conic section is given by the matrix below if the quadratic form is equal 70.

$A = \begin{bmatrix} 1 & -3 \\ -7 & 1 \end{bmatrix}$

Q5: Find $X(t)$ for the system below

$X_1 = -\frac{3}{2}X_1^* - \frac{1}{2}X_2^* + \frac{1}{2}u$

$X_2 = X_1^*$ , At $t = 0$, $u(\tau) = 1$, $X_1(0) = 0$, $X_2(0) = 0$.