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Electrical & Electronics Engineering

The set of model of a system is given as equation (a) with the aid of MATLAB, estimate the values of  $x$ 's in the model equation

$$\begin{cases} x_1 - 2x_2 - x_3 + 3x_4 = 10 \\ 2x_1 + 3x_2 + x_4 = 8 \\ x_1 - 4x_3 - 2x_4 = 3 \\ -x_2 + 3x_3 + x_4 = -4 \end{cases}$$

Using matlab

$$A = \begin{bmatrix} 1 & -2 & -1 & 3 \\ 2 & 3 & 0 & 1 \\ 1 & 0 & -4 & -2 \\ 0 & -1 & 3 & 1 \end{bmatrix} \quad x = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} \quad C = \begin{bmatrix} 10 \\ 8 \\ 3 \\ -7 \end{bmatrix}$$

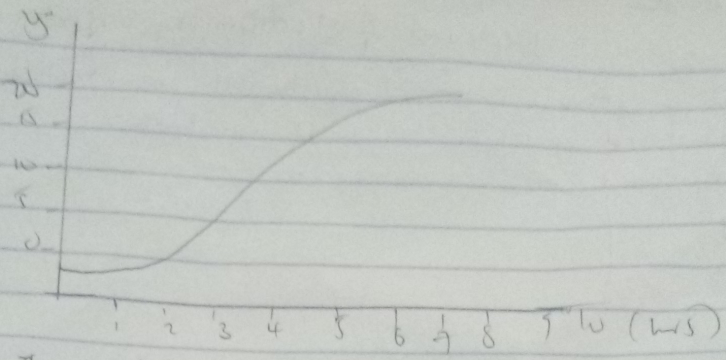
$$B = A^{-1}$$

$$B = \begin{bmatrix} 0.027 & 0.24 & 0.493 & 0.667 \\ -0.093 & 0.16 & -0.227 & -0.333 \\ -0.107 & 0.04 & 0.027 & 0.333 \\ 0.227 & -0.04 & -0.307 & -0.333 \end{bmatrix}$$

$$D = B \cdot C$$

$$D = \begin{bmatrix} -1 \\ 2 \\ -3 \\ 4 \end{bmatrix}$$

t	y
9.0	20.6807
9.1	20.8832
9.2	21.0833
9.3	21.2810
9.4	21.4764
9.5	21.8100
9.6	22.0482
9.7	22.2341
9.8	22.4175
9.9	22.4175



The model equation of a system has been developed to be represented by  
 $2t + e^{0.5t} - 2 \cos \pi t$  with the aid of Mathcad, determine the  
 dynamic response in tabular form for  $0 \leq t \leq 10$  with  $\Delta t = 0.1$

t	y	t	y	t	y
0	-1	2.0	3.044	4.0	8.2568
0.1	-0.8555	2.1	3.2887	4.1	8.5274
0.2	-0.7024	2.2	3.5358	4.2	8.7982
0.3	-0.5413	2.3	3.7852	4.3	9.0692
0.4	-0.3726	2.4	4.0367	4.4	9.3402
0.5	-0.1969	2.5	4.2903	4.5	9.6112
0.6	-0.0146	2.6	4.5458	4.6	9.8821
0.7	0.1738	2.7	4.8030	4.7	10.1529
0.8	0.3681	2.8	5.0619	4.8	10.4234
0.9	0.5679	2.9	5.3223	4.9	10.6935
1.0	0.7729	3.0	5.5841	5.0	10.9632
1.1	0.9824	3.1	5.8473	5.1	11.2325
1.2	1.1966	3.2	6.1116	5.2	11.5012
1.3	1.4150	3.3	6.3770	5.3	11.7692
1.4	1.6375	3.4	6.6433	5.4	12.0365
1.5	1.8637	3.5	6.9106	5.5	12.3031
1.6	2.0935	3.6	7.1787	5.6	12.5688
1.7	2.3266	3.7	7.4474	5.7	12.8335
1.8	2.5628	3.8	7.7166	5.8	13.0975
1.9	2.8021	3.9	7.9866	5.9	13.3600