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MATRIC NO: 18/ENGG01/002

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The set of models of a system is as given in Equation (1). With the aid of MathCAD estimate the values of the x 's in the model equation.

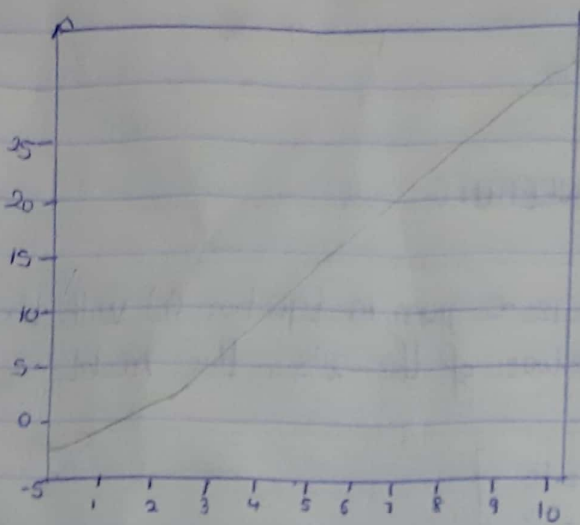
$$\begin{cases} x_1 - 2x_2 - x_3 + 3x_4 = 10 \\ 2x_1 + 3x_2 + 4x_3 = 8 \\ x_1 - 4x_2 - 2x_3 + x_4 = 3 \\ -x_2 + 3x_3 + x_4 = -7 \end{cases}$$

$$A = \begin{bmatrix} 1 & -2 & -1 & 3 \\ 2 & 3 & 0 & 1 \\ 1 & -4 & -2 & 1 \\ 0 & -1 & 3 & 1 \end{bmatrix}$$

$$C = \begin{bmatrix} 10 \\ 8 \\ 3 \\ -7 \end{bmatrix}$$

$$D = \begin{bmatrix} 0.0267 & 0.2400 & 0.4933 & 0.6667 \\ -0.0933 & 0.1600 & -0.2267 & -0.3333 \\ -0.1067 & 0.0400 & 0.0267 & 0.3333 \\ 0.2267 & 0.0400 & -0.3067 & -0.3333 \end{bmatrix}$$

$$E = \begin{bmatrix} -1.0000 \\ 2.0000 \\ -3.0000 \\ 4.0000 \end{bmatrix}$$



The model equation $y = \sin(0.25t) + 2t e^{-0.85t} - 2 \cos \frac{\pi t}{10}$
 $0 \leq t \leq 10 \text{ hrs}, \Delta t = 0.1 \text{ hr}$

$t = 0 : 0.1 : 10$

$$y = \sin(0.25 * t) + 2 * t * \exp(-0.85 * t) - 2 * \cos(\pi * t / 10)$$

Plot (t, y)

grid minor

grid on

[t' y']		
0 - 1.0000	1.4000	1.6375
0.1000 - 0.8555	1.5000	1.8637
0.2000 - 0.7024	1.6000	2.0935
0.3000 - 0.5413	1.7000	2.3266
0.4000 - 0.3726	1.8000	2.5628
0.5000 - 0.1969	1.9000	2.8021
0.6000 - 0.0146	2.0000	3.0441
0.7000 - 0.1738	2.1000	3.2887
0.8000 - 0.3861	2.2000	3.5358
0.9000 0.5679	2.3000	3.7852
1.0000 0.7827	2.4000	4.0367
1.1000 0.9824	2.5000	4.2903
1.2000 1.1666	2.6000	4.5458
1.3000 1.4150	2.7000	4.8030
	2.8000	5.0619

2.9000	5.3223	6.0000	13.6216
3.0000	5.841	6.1000	13.8820
3.1000	5.873	6.2000	14.1412
3.2000	6.1116	6.3000	14.3990
3.3000	6.3770	6.4000	14.6555
3.4000	6.6433	6.5000	14.9105
3.5000	6.9106	6.6000	15.1640
3.6000	7.1787	6.7000	15.4160
3.7000	7.4474	6.8000	15.4160
3.8000	7.7167	7.0000	15.6664
3.9000	7.9866	7.1000	16.4074
4.0000	8.2568	7.2000	16.6509
4.1000	8.5274	7.3000	16.8925
4.2000	8.7982	7.4000	17.1322
4.3000	9.0692	7.5000	17.3700
4.4000	9.3402	7.6000	17.6058
4.5000	9.6112	7.7000	17.8396
4.6000	9.8821	7.8000	18.0713
4.7000	10.1529	7.9000	18.3009
4.8000	10.4234	8.0000	18.5284
4.9000	10.6935	8.1000	18.7538
5.0000	10.9632	8.2000	18.9770
5.1000	11.2325	8.3000	19.1979
5.2000	11.5012	8.4000	19.4166
5.3000	11.7692	8.5000	19.6331
5.4000	12.0365	8.6000	19.8472
5.5000	12.3031	8.7000	20.0591
5.6000	12.5688	8.8000	20.2686
5.7000	12.8335	8.9000	20.4758
5.8000	13.0973	9.0000	20.6807
5.9000	13.3600	9.1000	20.8833

9.2000 21.8832

9.3000 21.2816

9.4000 21.4764

9.500 21.6694

9.600 21.6694

9.7000 21.0482

9.8000 22.2891

9.9000 22.4175

10.0000 22.5987