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18/ENGG06/023

MECHANICAL ENGINEERING

The set of models of a system is given in eqn ① with the aid of MATLAB estimate the values of the X's in the model equations.

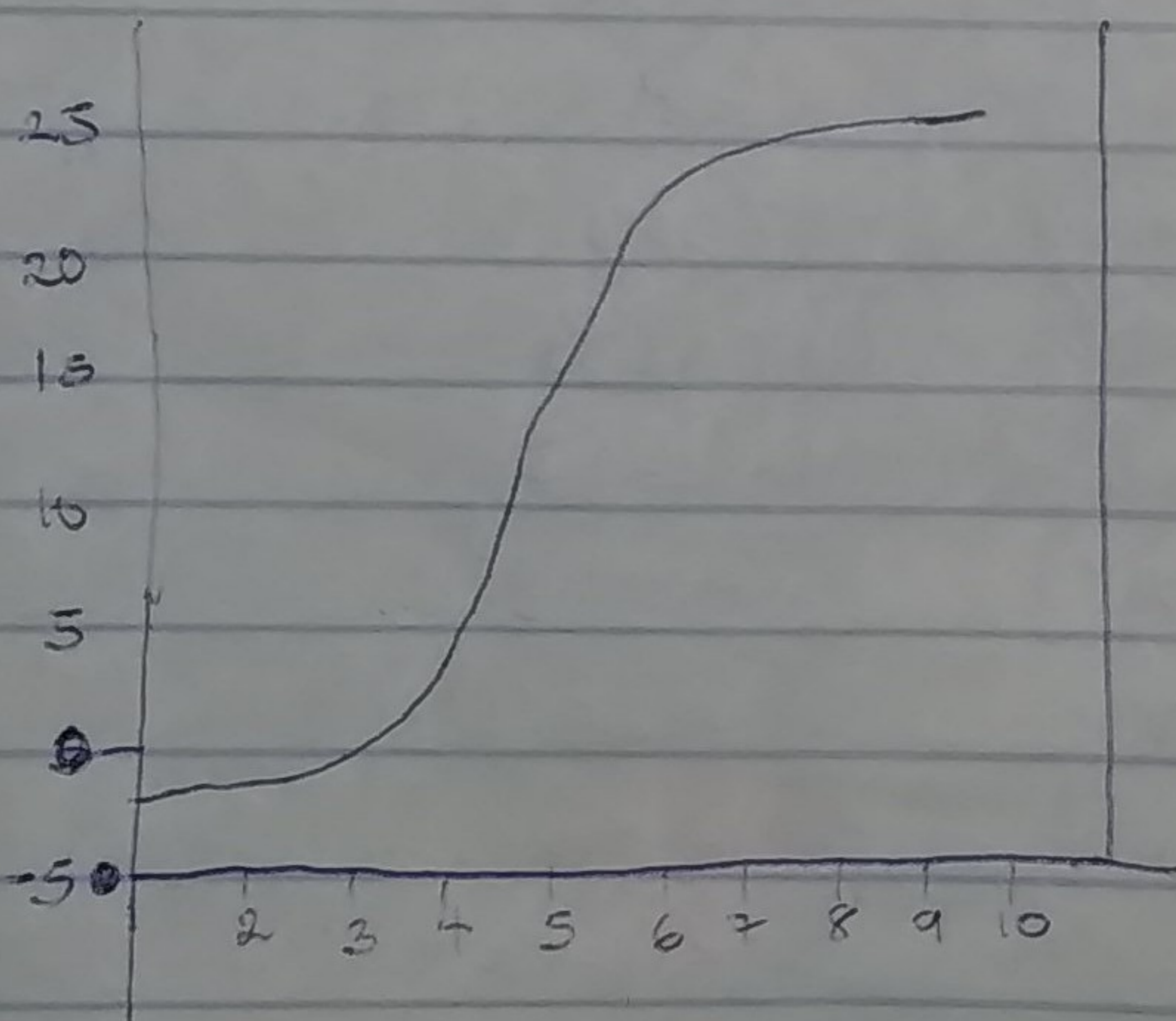
$$\begin{pmatrix} x_1 - 2x_2 - 3x_3 = 10 \\ 2x_1 + 3x_2 + x_3 = 8 \\ x_1 - 4x_2 - 2x_3 = 3 \\ -x_2 + 3x_3 + x_4 = -7 \end{pmatrix}$$

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

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

$$D = \begin{matrix} 0.0267 & 0.2400 & 0.4933 & 0.6667 \\ -0.0933 & 0.1600 & -0.2267 & -0.3333 \\ -0.1067 & 0.0400 & 0.0761 & 0.3333 \\ 0.2267 & 0.0400 & -0.3061 & 0.3333 \end{matrix}$$

$$\xi = \begin{matrix} -1.0000 \\ 2.0000 \\ -3.0000 \\ 4.0000 \end{matrix}$$



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

$t = 0.01 \cdot 10$

$y = \sin(0.25\pi t) + 2e + \exp(-0.85t) - 2\cos\left(\frac{\pi t}{10}\right)$

Plot (t, y)

grind mineral
grind on

[t' y']			
	1.4000		1.6375
0 - 0.0000	1.5000		1.8637
0.1000 - 0.8555	1.6000		2.0935
0.2000 - 0.7024	1.7000		2.3266
0.3000 - 0.5413	1.8000		2.5621
0.4000 - 0.3726	1.9000		2.8021
0.5000 - 0.1969	2.0000		3.0441
0.6000 - 0.0146	2.1000		3.2887
0.7000 - 0.1739	2.2000		3.5358
0.8000 - 0.3661	2.3000		3.7852
0.9000 - 0.5679	2.4000		4.0367
1.0000 - 0.7727	2.5000		4.2903
1.1000 - 0.9824	2.6000		4.5458
1.2000 1.966	2.7000		4.8030
1.3000 1.4150	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		14.1472
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		15.1625
3.6000 7.1787	6.7000		15.4104
3.7000 7.4474	6.8000		15.6540
3.8000 7.7167	7.0000		15.6664
3.9000			

3.9000	7.7167	7.100	16.4074
4.000	7.9866	7.200	16.6084
4.1000	8.2568	7.300	16.4074
4.2000	8.5274	7.400	16.6309
4.3000	8.7982	7.500	16.8921
4.4000	9.0692	7.6000	17.1322
4.5000	9.3412	7.7000	17.3700
4.6000	9.6121	7.800	17.6058
4.700	10.1529	7.9000	17.6058
4.800	10.4234	8.000	17.8596
4.900	10.6935	8.1000	17.6058
4.5.000	10.6935	8.2000	18.8396
5.1000	10.0632	8.3000	18.0813
5.200	11.2325	8.4000	18.3009
5.300	11.3012	8.5000	18.5788
5.4000	12.197092	8.6000	18.77538
5.5000	12.0363	8.7000	18.9770
5.6000	12.3031	8.8000	19.1979
5.7000	12.5680	8.9000	18.4166
5.8000	12.8733	9.0000	19.68331
5.9000	18.0993	9.0000	19.8472