МОДЕЛИ НА РЕАЛНИ ПРОЦЕСИ
Информатика, 2021/2022

Курсова работа 2.2

Да се реши по един пример от всяка задача.

Задача 1.

а)
$$\left|\begin{array}{l} \dot{x} = -5x - 2y - 2z \\ \dot{y} = 10x + 4y + 2z \\ \dot{z} = 2x + y + 3z \end{array}\right.$$
$(\lambda_1 = 1,\ \lambda_2 = 2,\ \lambda_3 = -1)$

б)
$$\left|\begin{array}{l} \dot{x} = -x + 2y - 4z \\ \dot{y} = -8x - 3y + 2z \\ \dot{z} = -2x - 4y + 6z \end{array}\right.$$
$(\lambda_1 = -2,\ \lambda_2 = 1,\ \lambda_3 = 3)$

в)
$$\left|\begin{array}{l} \dot{x} = 2x + y - 2z \\ \dot{y} = -x + z \\ \dot{z} = 2x + 2y - z \end{array}\right.$$
$(\lambda_1 = 1,\ \lambda_2 = i,\ \lambda_3 = -i)$

г)
$$\left|\begin{array}{l} \dot{x} = 2x - 4y \\ \dot{y} = x + 2y + z \\ \dot{z} = 3y + 2z \end{array}\right.$$
$(\lambda_1 = 2,\ \lambda_2 = 2 + i,\ \lambda_3 = 2 - i)$.

Задача 2.

а)
$$\left|\begin{array}{l} \dot{x} = -3x + y - 2z \\ \dot{y} = 4x + y \\ \dot{z} = 4x + z \end{array}\right.$$
$(\lambda_1 = 1,\ \lambda_2 = \lambda_3 = -1)$

б)
$$\left|\begin{array}{l} \dot{x} = 4x - 3y - z \\ \dot{y} = -x + 2y + z \\ \dot{z} = 4x - 4y - z \end{array}\right.$$
$(\lambda_1 = 3,\ \lambda_2 = \lambda_3 = 1)$

в)
$$\left|\begin{array}{l} \dot{x} = 2x + 12y - 3z \\ \dot{y} = -x - 5y + z \\ \dot{z} = -x - 12y + 4z \end{array}\right.$$
$(\lambda_1 = -1,\ \lambda_2 = \lambda_3 = 1)$

г)
$$\left|\begin{array}{l} \dot{x} = 2x - 5y - 8z \\ \dot{y} = 7x - 11y - 17z \\ \dot{z} = -3x + 4y + 6z \end{array}\right.$$
$(\lambda_1 = \lambda_2 = \lambda_3 = -1)$.

Задача 3.

а) $\left|\begin{array}{l} \dot{x} = -2x + 4y + \frac{1}{1+e^t} \\ \dot{y} = -2x + 4y - \frac{1}{1+e^t} \end{array}\right.$

б) $\left|\begin{array}{l} \dot{x} = 3x - 6y + \frac{1}{\cos^3 3t} \\ \dot{y} = 3x - 3y \end{array}\right.$

в) $\left|\begin{array}{l} \dot{x} = -3x + y \\ \dot{y} = -4x + y + \frac{1}{te^t} \end{array}\right.$

г) $\left|\begin{array}{l} \dot{x} = 3x + y \\ \dot{y} = -4x - y + \frac{e^t}{2\sqrt{t}}. \end{array}\right.$

Задача 4.

а) $\left|\begin{array}{l} \dot{x} = -2x - y + 37\sin t \\ \dot{y} = -4x - 5y \end{array}\right.$

б) $\left|\begin{array}{l} \dot{x} = 3x - 5y - 2e^t \\ \dot{y} = x - y - e^t \end{array}\right.$

в) $\left|\begin{array}{l} \dot{x} = -4x - 4y + 2e^{2t} \\ \dot{y} = 6x + 6y + 2t \end{array}\right.$

г) $\left|\begin{array}{l} \dot{x} = 4x - y \\ \dot{y} = x + 2y + 2e^{-3t}. \end{array}\right.$