МОДЕЛИ НА РЕАЛНИ ПРОЦЕСИ
спец. Информатика, 2021/2022

Курсова работа 2.2

Да се реши по един пример от ***всяка*** *задача.*

Задача 1.

а)
$$\left|\begin{array}{l} \dot{x} = -2x + 6y - 4z \\ \dot{y} = 9x - 5y + 6z \\ \dot{z} = 15x - 18y + 15z \end{array}\right.$$
$(\lambda_1 = 1,\ \lambda_2 = 3,\ \lambda_3 = 4)$

б)
$$\left|\begin{array}{l} \dot{x} = -2x + 2y - z \\ \dot{y} = -6x + 2y - 2z \\ \dot{z} = -6x - 2y - z \end{array}\right.$$
$(\lambda_1 = -2,\ \lambda_2 = 0,\ \lambda_3 = 1)$

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

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

Задача 2.

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

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

в)
$$\left|\begin{array}{l} \dot{x} = x + 5y - 2z \\ \dot{y} = -x + 5y - 2z \\ \dot{z} = -2x + 15y - 6z \end{array}\right.$$
$(\lambda_1 = \lambda_2 = \lambda_3 = 0)$

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

Задача 3.

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

б) $\left|\begin{array}{l} \dot{x} = 4x - 8y + \operatorname{tg} 4t \\ \dot{y} = 4x - 4y \end{array}\right.$

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

г) $\left|\begin{array}{l} \dot{x} = 4x - 2y \\ \dot{y} = 8x - 4y + \sqrt{t}. \end{array}\right.$

Задача 4.

а) $\left|\begin{array}{l} \dot{x} = -2x - y + 36t \\ \dot{y} = -4x - 5y \end{array}\right.$

б) $\left|\begin{array}{l} \dot{x} = 5x - y + 5\sin t \\ \dot{y} = 4x + y + 3\sin t - \cos t \end{array}\right.$

в) $\left|\begin{array}{l} \dot{x} = 6x - 3y + 30e^t \\ \dot{y} = 15x - 6y + 45t \end{array}\right.$

г) $\left|\begin{array}{l} \dot{x} = -6x - 10y + 4\sin 2t \\ \dot{y} = 4x + 6y. \end{array}\right.$