

Домашнее задание № 8 Контроль

№ 14.9

$$y'' + 4y = 0$$

$$R_2(\kappa) = \kappa^2 + 4$$

$$\kappa^2 + 4 = 0, \quad \kappa^2 = -4$$

$$\kappa = \pm i2, \quad \kappa = \pm i2$$

$$e^{\alpha x} (C_1 \cos \beta x + C_2 \sin \beta x), \quad C_1, C_2 \in \mathbb{R}$$

$$\alpha = 0, \quad \beta = 2$$

Ответ:

$$y = e^{0x} (C_1 \cos 2x + C_2 \sin 2x)$$

№ 74. 10

Control

$$y'' - 10y' + 25y = 0$$

$$R_2(\kappa) = \kappa^2 - 10\kappa + 25$$

$$\kappa^2 - 10\kappa + 25 = 0$$

$$D = 100 - 100 = 0$$

$$\kappa_{1,2} = 5$$

$\kappa_{1,2} = 5$ - корень кратности 5

$$y_{o.p.} = e^{5x} (C_1 + C_2 x + C_3 x^2 + C_4 x^3 + C_5 x^4)$$

Ответ:

$$y_{o.p.} = e^{5x} (C_1 + C_2 x + C_3 x^2 + C_4 x^3 + C_5 x^4)$$

N 14.11

Control

$$y'' + 3y' + 2y = 0$$

$$R_2(\kappa) = \kappa^2 + 3\kappa + 2 = 0$$

$$\kappa^2 + 3\kappa + 2 = 0$$

$$D = 9 - 8 = 1$$

$$\kappa_1 = \frac{-3-1}{2} = -2$$

$$\kappa_2 = \frac{-3+1}{2} = -1$$

-2, -1 - корни характеристического

$$C_i e^{\kappa_i x}, C_i \in \mathbb{R}$$

Ответ:

$$y = C_1 e^{-2x} + C_2 e^{-x}$$

N 14. 12

Control

$$y'' - 4y' + 13y = 0$$

$$R_2(\kappa) = \kappa^2 - 4\kappa + 13$$

$$\kappa^2 - 4\kappa + 13 = 0$$

$$D = 16 - 52 = -36$$

$$\kappa_{1,2} = \frac{4 \pm i6}{2} = 2 \pm i3$$

$$\alpha = 2, \beta = 3$$

$$y = C_1 e^{2x} \cos 3x + C_2 e^{2x} \sin 3x$$

Orbital:

$$y = e^{2x} (C_1 \cos 3x + C_2 \sin 3x)$$

N 14. 13

Control

$$y^{IV} - 2y''' + y'' = 0$$

$$R_y(\kappa) = \kappa^4 - 2\kappa^3 + \kappa^2$$

$$\kappa^2(\kappa^2 - 2\kappa + 1) = 0$$

$$\kappa_{1,2} = 0$$

$$C_i e^{\kappa_i x}$$

$$\kappa^2 - 2\kappa + 1 = 0$$

$$D = 4 - 4 = 0$$

$$\kappa_{3,4} = \frac{2}{2} = 1$$

$$y = C_1 e^{0x} + C_2 e^{0x} + C_3 e^x + C_4 e^x$$

Omben:

$$y = C_1 e^{0x} + C_2 e^{0x} + C_3 e^x + C_4 e^x =$$

$$= C_1 + C_2 + e^x(C_3 + C_4)$$