• počáteční podmínky: $\overset{x}{y(0)} = \overset{y}{\begin{pmatrix} 1 \\ 2 \end{pmatrix}}$

$$1 = c_1 \cancel{\cdot} -2c_2 + 1 - 12$$
$$2 = -2c_1 + c_2 - 2 + 4$$

$$12 = c_1 - 2c_2$$
$$0 = -2c_1 + c_2 \quad / \cdot (+2)$$

$$12 = \cancel{5} - 3c_1 \quad \Rightarrow \underline{c_1 = -4}$$
$$c_2 = 2c_1 \Rightarrow \underline{c_2 = -8}$$

$$\underline{y = \begin{pmatrix} -4 \\ -8 \end{pmatrix} e^{-5x} + \begin{pmatrix} 16 \\ -8 \end{pmatrix} e^{-2x} + \begin{pmatrix} 1 \\ -2 \end{pmatrix} e^{2x} + \begin{pmatrix} -12 \\ 4 \end{pmatrix}}$$

• y_{p_2} pomocí variace konstant z $\underline{y_h = c_1(x) \begin{pmatrix} 1 \\ -2 \end{pmatrix} e^{-5x} + c_2(x) \begin{pmatrix} -2 \\ 1 \end{pmatrix} e^{-2x}}$

$$f_2 = \begin{pmatrix} -20 \\ 0 \end{pmatrix}$$

$$\boxed{U \cdot c' = f_2}$$

$$(u_1, u_2) \begin{pmatrix} c_1'(x) \\ c_2'(x) \end{pmatrix} = \begin{pmatrix} -20 \\ 0 \end{pmatrix}$$

$$U = \begin{vmatrix} e^{-5x} & -2e^{-2x} \\ -2e^{-5x} & e^{-2x} \end{vmatrix} = e^{-7x} - 4e^{-7x} = -3e^{-7x}$$

$$|U_1| = \begin{vmatrix} -20 & -2e^{2x} \\ 0 & e^{-2x} \end{vmatrix} = -20e^{-2x}$$

$$|U_2| = \begin{vmatrix} e^{-5x} & -20 \\ -2e^{-5x} & 0 \end{vmatrix} = -40e^{-5x}$$

$$c_1' = \frac{|U_1|}{|U|} = \frac{+20e^{-2x}}{+3e^{-7x}} = \frac{20}{3}e^{5x} \qquad \frac{dc_1}{dx} = \frac{20}{3}e^{5x} \Rightarrow \int dc = \int \frac{20}{3} e^{5x} dx$$

$$c_1 = \frac{20}{3 \cdot 5} e^{5x} + D_1$$

$$\underline{c_1 = \frac{4}{3} e^{5x} + D_1}$$

$$c_2' = \frac{|U_2|}{|U|} = \frac{+40e^{-5x}}{+3e^{-7x}} = \frac{40}{3} e^{2x} \qquad \int dc_2 = \int \frac{40}{3} e^{2x} dx$$

$$\underline{c_2 = \frac{20}{3} e^{2x} + D_2}$$

$$y = D_1 \begin{pmatrix} 1 \\ -2 \end{pmatrix} e^{-5x} + D_2 \begin{pmatrix} -2 \\ 1 \end{pmatrix} + \begin{pmatrix} 1 \\ -2 \end{pmatrix} e^{2x} + \underbrace{\begin{pmatrix} \frac{4}{3} - \frac{40}{3} \\ -\frac{8}{3} + \frac{20}{3} \end{pmatrix}}_{\begin{pmatrix} -12 \\ 4 \end{pmatrix}}$$