$y = y(x)$

7.) $y'' - 4y' + 4y = \underbrace{x^2}_{"f(x)"}$; $y(0) = 1$, $y'(0) = -1$

homog. rce $\quad y'' - 4y' + 4y = 0$

$$\lambda^2 - 4\lambda + 4 = 0$$

$$(\lambda - 2)^2 = 0 \Rightarrow \lambda_{1,2} = 2$$

2-más. kořen

$$F.S. = \{e^{2x}, xe^{2x}\}$$

$$y_H = C_1 e^{2x} + C_2 x e^{2x}$$

~~obec~~ O.Ř.: $y = y_H + y_P$

$\alpha = 0, \omega = 0$

"$\lambda = 0$" e^{0x}

hledám y_P $\quad f(x) = $ polynom 2. st

$$y_P = ax^2 + bx + c$$

$$y_P' = 2ax + b \qquad y_P'' = 2a$$

y_P splní rci: $\quad 2a - 4(2ax + b) + 4(ax^2 + bx + c) = x^2$

$$2a - 8ax - 4b + 4ax^2 + 4bx + 4c = x^2 + 0x + 0$$

$$2a - 4b + 4c = 0 \qquad \frac{1}{2} - 2 = -4c \rightarrow c = \frac{3}{8}$$

$$-8a + 4b = 0 \qquad b = \frac{1}{2}$$

$$4a = 1 \Rightarrow a = \frac{1}{4}$$

$$y_P = \frac{1}{4}x^2 + \frac{1}{2}x + \frac{3}{8}$$

O.Ř.:

$$y = C_1 e^{2x} + C_2 x e^{2x} + \frac{1}{4}x^2 + \frac{1}{2}x + \frac{3}{8}$$

Cauchy:

$\left[C_1 = \frac{5}{8}, C_2 = -\frac{11}{4}\right]$