

Seminar05 - Rezolvare

Exercițiu 01 & 02

① $y' - y = 0$

$$\frac{dy}{dx} = y$$

$$\frac{dy}{y} = dx$$

$$\int \frac{1}{y} dy = \int dx$$

$$\ln|y| = x + C$$

$$|y| = e^{x+C}$$

$$y = e^{x+C}$$

② $y = x^2 - Cx$

$$y' = 2x - C \Rightarrow C = 2x - y'$$

$$y = x^2 - x(2x - y')$$

$$y = x^2 - 2x^2 + xy'$$

$$xy' = y + x^2$$

$$y' = \frac{y}{x} + x = \frac{1}{x}y + x$$

Step 1 $y' = \frac{1}{x}y$

$$\frac{dy}{dx} = \frac{y}{x}$$

$$\frac{dy}{y} = \frac{dx}{x}$$

$$\int \frac{1}{y} dy = \int \frac{1}{x} dx \Rightarrow \ln|y| = \ln|x| + C$$

$$y_0 = Cx$$

Step 2 $y_0 = C(x) \cdot x$

$$(C(x) \cdot x)' = \frac{C(x) \cdot x}{x} + x$$

$$C'(x) \cdot x + C(x) = C(x) + x$$

$$C'(x) = 1 \Rightarrow C(x) = \int 1 dx = x$$

$$C(x) = x + C_1$$

$$y_0 = (C_1 + x) \cdot x = C_1x + x^2$$

$$y = y_0 + y_1 = Cx + x^2$$