

Differential equations

Exercise 1. Try out the following commands.

$$y'=2x+3$$

$y'=2x+3, y[2]=1$ – an equation with an initial condition

$$y'=3x^2/E^y$$

$y'=3x^2/E^y, y[0]=1$ – another equation with an initial condition

$$y'=(x*y+y^2)/x^2$$

$$x*y' + 2y = 10x^2$$

Remember to write y' instead of dy/dx !!!

Solve the following differential equations:

$$(a) \quad y' = \frac{y+1}{x+1}, \quad y(0) = 1$$

$$(b) \quad y^2 \cdot \frac{dy}{dx} = x, \quad y(0) = 1$$

$$(c) \quad \frac{dy}{dx} = e^{2x+y}, \quad y(0) = 0$$

$$(d) \quad y' = \frac{y}{x} + \tan \frac{y}{x}$$

$$(e) \quad x \cdot y' = y(1 + \ln y - \ln x)$$

$$(f) \quad x - y \cdot \cos \frac{y}{x} + x \cdot y' \cdot \cos \frac{y}{x} = 0$$

$$(g) \quad xy' - 2y = x^4 \sin x$$