

 $x y'' + y' + y = 0$ 

NATURAL LANGUAGE



MATH INPUT



EXTENDED KEYBOARD



EXAMPLES



UPLOAD



RANDOM

Input

$$x y''(x) + y'(x) + y(x) = 0$$

Sturm-Liouville equation

$$\frac{d}{dx}(x y'(x)) + y(x) = 0$$

[Sturm-Liouville equation »](#)

ODE classification

second-order linear ordinary differential equation

Alternate form

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

Differential equation solution

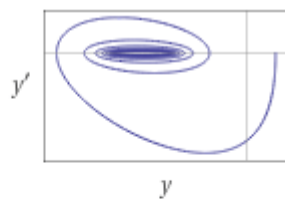
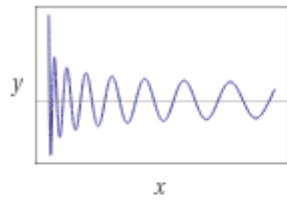
$$y(x) = c_1 J_0(2\sqrt{x}) + c_2 Y_0(2\sqrt{x})$$

 $J_n(z)$ is the Bessel function of the first kind $Y_n(x)$ is the Bessel function of the second kind

Plots of sample individual solutions

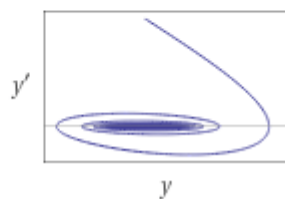
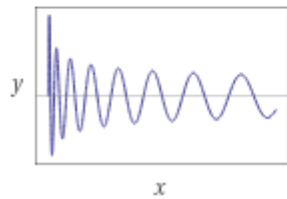
Start coding »

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Language — the
language that built
Wolfram|Alpha.*



$$y(1) = 1$$

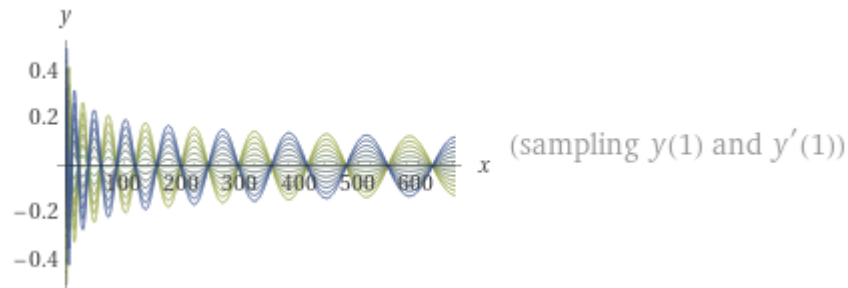
$$y'(1) = 0$$



$$y(1) = 0$$

$$y'(1) = 1$$

Sample solution family



Possible Lagrangian

$$\mathcal{L}(y', y, x) = \frac{1}{2} (x (y')^2 - y^2)$$

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