

Homework 6 – Due June 3

Probl. 10 / Pg. 206

Find a general solution to the differential equation using the method of variation of parameters

$$y'' + 4y' + 4y = e^{-2t} \ln t$$

Probl. 18 / Pg. 207

Find a general solution to the differential equation

$$y'' - 6y' + 9y = t^{-3} e^{3t}$$

Probl. 12 / Pg. 214

Find a general solution to the given Cauchy-Euler equation for $t > 0$.

$$t^2 \frac{d^2 z}{dt^2} + 5t \frac{dz}{dt} + 4z = 0$$

Probl. 24 / Pg. 215

Solve the following Cauchy-Euler equation, by changing it to constant coefficient equation, finding its general solution by the method of preceding sections, and restoring the original independent variable t .

$$t^2 y'' + 3ty' + y = t + t^{-1}$$

Probl. 38 / Pg. 216

Use variation of parameters to find a general solution to the differential equation given that the functions y_1 and y_2 are linearly independent solutions to the corresponding homogenous equation for $t > 0$. Remember to put the equation in standard form.

$$\begin{aligned} t^2 y'' - 4ty' + 6y &= t^3 + 1 \\ y_1 &= t^2 & y_2 &= t^3 \end{aligned}$$

Probl. 46 / Pg. 217

A differential equation and a non-trivial solution f are given. Find a second linearly independent solution using reduction of order.

$$t^2 y'' + 6ty' + 6y = 0, \quad t > 0, \quad f(t) = t^{-2}$$