

HOMEWORK # 2¹

1. Use the method of variation to find the general solution of the following second order differential equation

$$y'' + 2y' + y = xe^{-x} \quad (1)$$

2. Find the general solution of the following second-order differential equation using power series solution.

$$(x^2 + 1)y'' + xy' - y = 0 \quad (2)$$

3. Use the Frobenius series to find the solution of

$$x^2y'' + x(2+x)y' - 2y = 0 \quad (3)$$

in some interval $0 < x < d$.

4. Find the Fourier series of the function

$$f(x) = \begin{cases} f(x) = x & 0 \leq x \leq \pi \\ f(x) = \pi & \pi \leq x \leq 2\pi \end{cases} \quad (4)$$

5. Solve the following initial value problem

$$x_1' = 2x_1 - x_2 + 4 - t^2 \quad (5)$$

$$x_2' = -x_1 + 2x_2 + 1 \quad (6)$$

with $x_1(0) = 1$ and $x_2(0) = 0$.

¹Return date is on 6 April 2012.