Practice examples

1. Solve the initial value problem $y'' - 6y' + 9y = 0$, $y(0) = 2$, $y'(0) = 8$.
2. Solve the differential equation $y'' + 4y' + 5y = 0$.

3. Solve $y'' - 2y' = e^x \sin x$ using the method of variation of parameters.
4. Solve $y'' + 3y' + 2y = \sin(e^x)$ using the method of variation of parameters.
5. Solve $(D^2 + 2D + 1)y = 4e^{-x} \log x$ using the method of variation of parameters.

6. Solve $y''' + 3y'' + 3y' + y = 8e^x + x + 2$ using method of undetermined coefficients.

7. Solve $x^2 \dfrac{d^2 y}{dx^2} + x \dfrac{dy}{dx} + y = \log x \sin(\log x)$.

8. Using the method of undetermined coefficients find the solution of $y'' + 3y' = 28 \sinh 4x$.

9. Solve: $\dfrac{dx}{dt} + 2\dfrac{dy}{dt} - 2x + 2y = 3e^t; 3\dfrac{dx}{dt} + \dfrac{dy}{dt} + 2x + y = 4e^{2t}$.

10. Solve: $(2x + 3)^2 \dfrac{d^2 y}{dx^2} - 2(2x + 3)\dfrac{dy}{dx} - 12y = 6x$.