Class 9– Solution of differential equations by the method of Variation of parameters

Solve the following Differential Equations by the method of variation of parameters

1. $y'' + y = \frac{1}{1+\sin x}$

Answer : $y = a\cos x + b\sin x - x\cos x - 1 + \sin x \log(1+\sin x)$

2. $y'' + y = \sec x \tan x$

Answer : $y = \cos x\,(x - \tan x + c_1) + \sin x\,(\log secx + c_2)$

3. $x^2y'' + x\,y' - y = x^2 \log x$

Answer : $y = ax + \frac{b}{x} + \frac{1}{3}x^2 \log x - \frac{4}{9}x^2$

4. $y'' + 2y' + 2y = e^{-x}\sec^3 x$

Answer : $y = e^{x} cos\, x\,(a - \frac{1}{2}\tan^2 x) + e^{-x}\sin x\,(b + \tan x)$

5. $y'' - 3y' + 2y = \frac{e^x}{1+e^x}$

Answer : $y = ae^x + be^{-x} - 1 + (e^x + e^{-x})\log(1+e^{-x})$

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