

## SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)

Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai Accredited by NAAC-UGC with 'A++' Grade (Cycle III) & COIMBATORE-641 035, TAMIL NADU

## **DEPARTMENT OF MATHEMATICS**

Method of variation of parameters:

The Second order linear differential equation is,

$$\frac{d^2y}{dx^2} + P \frac{dy}{dx} + Q \cdot y = R$$

Step 1: Find Complimentary function. From this calculate  $y$ , and  $y_2$  (Coefficient of Constant).

Step 2: Find Wronskian.

$$W = \begin{vmatrix} y_1 & y_2 \\ y'_1 & y'_2 \end{vmatrix} \neq 0$$

$$P. T = Py_1 + Q \cdot y_2$$
where  $P = -\int \frac{R}{W} y_2 dx$ 

$$Q = \int \frac{R}{W} y_1 dx$$

The Second order linear differential equation is  $\frac{d^2y}{dx^2} + Q \cdot y_2 = 0$ 

$$Q \cdot y_1 = Q \cdot y_2 = 0$$

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DEPATMENT OF MATHEMATICS

$$\frac{dy}{dx^{2}} + 4y = cosec x$$

The A.E is

$$m^{2} + 4 = 0$$

$$m^{2} = -4$$

$$m = \pm 2i = 0 \pm 2i$$

$$\alpha = 0, \beta = 2$$

C.F =  $e^{\alpha x}$  (A cos  $\beta x + \beta \sin \beta x$ )
$$= e^{0x}$$
 (A cos  $\alpha x + \beta \sin \alpha x$ )

C.F = A cos  $\alpha x + \beta \sin \alpha x$ 

$$y_{1} = cos \alpha x + \beta \sin \alpha x$$

$$y_{2} = cos \alpha x + \beta \sin \alpha x$$

$$y'_{3} = -\sin \alpha x + \cos \alpha x + \beta \sin \alpha x$$

$$y'_{4} = -\sin \alpha x + \cos \alpha x + \beta \sin \alpha x$$

$$y'_{5} = -\cos \alpha x + \beta \sin \alpha x$$

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