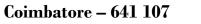


SNS COLLEGE OF ENGINEERING





TOPIC : 3 - Taylor's series Method for solving simultaneous first order differential equations

SNSCE/ UNIT 4/ NM/4.3 – Taylor's series Method for solving simultaneous first order differential equations / Dr. N. VITHYA/AP/MATHS

$$Z_{1} = Z(0-1) = Z_{2} + \frac{h}{U} Z_{1}^{1} + \frac{h^{2}}{U} Z_{1}^{11} + \frac{h^{3}}{U} Z_{1}^{11} + \frac{h^{4}}{U} Z_{1}^{14} + \cdots$$

$$= 1 + (0-1)(1) + \frac{(0-1)^{2}}{U^{2}}(2) + \frac{(0-1)^{3}}{U^{3}}(1) + \frac{(0-1)^{4}}{U}(0) + \cdots$$

$$= 1 + 0-1 + 0-01 + 0-000 167$$

= 1.110167

Solving Higher order Linear Dimesential Equations Erromple: By Taylor's series Method find y10-1) given that y'' = y + x y'', y = 1, y' = 0. Schution Here xore, yo=1, yo=0. Siven y'' = y + xy | yo'' = yo + xo yo = 1+(0)(0) = 1 y''' = y' + 2cy'' + y'= 2y' + 2cy'' = 2y_0' + 2cy'' = 2y_0' + 2cy'' = 2y_0' + 2cy'' = 2(0) + 0(1) = 260+0(1)=0. $y'' = .2y'' + xy''' + y'' \qquad y_0'' = 3y_0'' + x_0y_0'' = 3y'' + x_0y_0'' = 3(1) + (0)(0) = 3$ · $y(n) = y_0 + \alpha y_0 + \frac{\alpha^2}{12} y_0^2 + \frac{\alpha^3}{12} y_0^{11} + \frac{\alpha^3}{12}$ $= 1 + \phi + \frac{\phi + \phi}{12}(1) + \phi + \frac{24}{14}(1) + \cdots$ $= 1 + \frac{\chi^2}{2} + \frac{\chi^4}{8} + \cdots$ $y(0,1) = 1 + \frac{(0,1)^2}{2} + \frac{(0,1)^4}{8}$ = 1+ 0-005+ 0-0000125 = 1.005D.

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