

SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore - 641 107



AN AUTONOMOUS INSTITUTION

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

Topic: 5.11 – Milnes Predictor Corrector Formula

Milne's Predictor Corrector Method
Milne's Corrector Predictor formula

$$y_{n+1,p} = y_{n-3} + \frac{1}{3} \left(2y'_{n-2} - y'_{n-1} + 2y'_{n}\right)$$

Milne's Corrector formula.
 $y_{n+1,c} = y_{n-1} + \frac{1}{3} \left(y'_{n-1} + 4y'_{n} + y'_{n+1}\right)$

PREDICTOR - CORRECTOR METHODS

PREDICTOR FORMULA :

CORRECTOR FORMULA



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2. Using Milne's Predictor - corrector method, find
$$y(4+4)$$
 given $5xy'+y^2-2=0$; $y(4)=1$, $y(4+1)=1\cdot0069$, $y(4+2)=1\cdot0097$, $y(4+3)=1\cdot0$ [Fau MIT'12, M/T]

Soln:

Milne's Predictor - corrector for muta is

 $y_{n+1,p} = y_{n-3} + \frac{4h}{3} \left(2y_{n-1}' - y_{n-1}' + 2y_{n}'\right)$
 $y_{n,p} = y_{n} + \frac{4h}{3} \left(2y_{n-1}' - y_{n-1}' + 2y_{n}'\right)$

Given $5xy'+y^2-2=0$, $x_0=4$, $x_1=4\cdot1$, $x_2=4\cdot2$, $x_3=4\cdot3$, $x_1=2-y^2$, $y_1=1$, $y_1=1\cdot0049$, $y_2=1\cdot0097$, $y_1=2-y^2$, $y_2=1$, $y_1=1\cdot0049$, $y_2=1\cdot0097$, $y_1=2-y^2$, $y_2=1\cdot014\cdot3$
 $y_1'=\frac{2-y_1^2}{5x_1}=\frac{2-(1\cdot0049)^2}{5(4\cdot2)}=0\cdot049\cdot3$.

 $y_2'=\frac{2-y_1^2}{5x_2}=\frac{2-(1\cdot0097)^2}{5(4\cdot2)}=0\cdot049\cdot7$.

 $y_3'=\frac{2-y_1^2}{5x_3}=\frac{2-(1\cdot0143)}{5(4\cdot3)}=0\cdot049\cdot7$.

Sub all these values in 0, $y_{n,p}=1+\frac{4x(0)}{3}$ [2 (0.0493) $-0\cdot0467+2(0\cdot0452)$]

 $y_{n,p}=\frac{2-y_{n-1}^2}{5(x_1)}=\frac{2-(1\cdot01897)^2}{5(4\cdot4)}=0\cdot045\cdot7$.

Using Milne's corrector formula, $y_{n,p}=\frac{2-y_1}{3}=\frac{2-y_1^2}{3}=\frac{2-(1\cdot01897)^2}{5(4\cdot4)}=\frac{2-y_1^2}{3}=\frac{2-(1\cdot01897)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot0187)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-(1\cdot018)^2}{5(4\cdot4)}=\frac{2-($