

$$V \cdot \frac{(t_0 y)^{t_0}}{x^{t_0}} = \frac{1}{3x}$$

$$f(x,y) = -y + \ln x \quad x_0=2, y_0=1, h=0.3$$

$$k_1 = -1 + \ln(2) = -0.3$$

$$k_2 = f\left(x_1 + \frac{h}{2}, y_1 + \frac{h}{2}(k_1)\right) = f\left(2 + \frac{0.3}{2}, 1 + \frac{0.3}{2}(-0.3)\right)$$

$$f(2.15, 0.955)$$

$$k_2 = -0.2 \text{ or } (-0.1895)$$

$$k_3 = f\left(x_1 + \frac{h}{2}, y_1 + \frac{h}{2}(k_2)\right) \Rightarrow f(2.15, 0.97)$$

$$k_3 = -0.2$$

~~$$k_4 = f\left(x_1 + \frac{h}{2}, y_1 + \frac{h}{2}(k_3)\right) \Rightarrow f(2.15, 0.97)$$~~

$$k_4 = f(x_0 + h, y_0 + k_3 \cdot h) = f(2.3, 0.94)$$

$$k_4 = -0.1$$

$$y_1 = y_0 + \frac{h}{6} (k_1 + 2k_2 + 2k_3 + k_4)$$

$$= 1 + \frac{0.3}{6} (-0.3 - (0.2)(2) + 2(-0.2) + (-0.1))$$

$$y_1 = 0.94$$

$$x_1 = 2.3$$

$$y(x, y) = -y + \ln x \quad x_0=2, y_0=1, h=0.3$$

$$y_1 = 0.9399$$

$$x_1 = 2.3$$

Finding  $y_2$ :

$$k = -0.94 + \ln(2.3) = -0.1070$$

$$k_2 = f\left(2.3 + \frac{0.3}{2}, 0.94 + \frac{0.3}{2}(-0.1)\right) \Rightarrow f(2.5, 0.9)$$

$$-0.9 + \ln(2.5)$$

$$k_2 = 0.0278$$

$$k_3 = f\left(2.5, 0.94 + \frac{0.3}{2}(0.01)\right) = f(2.5, 0.9)$$

$$k_3 = -0.9 + \ln(2.5)$$

$$= 0.0396$$

$$k_4 = f(2.6, 0.9280)$$

$$-0.9280 + 0.9555 = 0.0275$$

$$y_2 = 0.9399 + 0.05(-0.2243) \approx 0.9287$$

⑨

Step 3 :  $n=2 \rightarrow n=3$

$$x_2 = 2.6, y_2 = 0.9287$$

$$k_1 = f(2.6, 0.9287) = -0.9287 + \ln 2.6 \approx 0.0268$$

$$k_2 = f(2.75, 0.9321) = 0.0789$$

$$k_3 = f(2.75, 0.9405) = 0.0711$$

$$k_4 = f(2.9, 0.9500) = 0.1147$$

$$y_3 = 0.9287 + 0.05(0.4415) = 0.9508$$

Step 4.

$$x_3 = 2.9, y_3 = 0.9508$$

$$k_1 = f(2.9, 0.9508) \approx 0.1139.$$

$$k_2 = f(3.05, 0.9679)$$

$$= -0.9679 + \ln 3.05 \approx 0.1472.$$

$$k_3 = f(3.05, 0.9729) \approx 0.1422.$$

$$k_4 = f(3.05, 0.9935) \approx 0.1697$$

$$y_4 = 0.9508 + 0.05(0.8624) \approx 0.9939.$$

$$x_4 = 3.2, y_4 = 0.9939.$$

$$\text{Step 5. } x_4 = 3.2 \quad y_4 = 0.9939$$

$$k_1 = -0.9939 + \ln 3.2 \approx 0.1693$$

$$k_2 = f(3.35, 1.0193)$$

$$k_2 = 0.1898$$

$$k_3 = f(3.35, 1.0224)$$

$$k_3 = 0.1867$$

$$k_4 = f(3.5, 1.0499) \approx 0.2029$$

$$y_5 = 0.9939 + 0.05(1.1252) \approx 1.0502$$

$$x_5 = 3.5, \quad y_5 = 1.0502$$

Step n	$x_n$	$y_n$
0	2	1
1	2.3	0.9399
2	2.6	0.9287
3	2.9	0.9508
4	3.2	0.9939
5	3.5	1.0502