$y' = \frac{y}{e^x - 1}$ $x_0 = 1$ $h = 0.02$ $y_0 = 5$

Jordan Scott
Angel Velazquez

$y_1 = y_0 + h T_4(x_0, y_0, h) = 5 + \frac{0.02}{6}(1, 5, 0.02)$

$K_1 = (1,5) = \frac{5}{e^1 - 1} = 2.9099$

$K_2 = (x_0 + \frac{h}{2}, y_0 + \frac{h}{2}(K_1)) = (1 + \frac{0.02}{2}, 5 + \frac{0.02}{2}(2.9099))$

$= (1.01, 5.0291) = \frac{5.0291}{e^{1.01} - 1} = 2.8810$

$K_3 = (x_0 + \frac{h}{2}, y + \frac{h}{2} k_2) = (1 + \frac{0.02}{2}, 5 + \frac{0.02}{2}(2.8810))$

$= (1.01, 5.0288) = \frac{5.0288}{e^{1.01} - 1} = 2.8808$

$K_4 = (x_0 + h, y + h k_3) = (1 + 0.02, 5 + 0.02(2.8808))$

$= (1.02, 5.0576) = \frac{5.0576}{e^{1.02} - 1} = 2.8523$

$y_2 = 5 + \frac{0.02}{6}(2.9099 + 2(2.8810) + 2(2.8808) + 2.8523)$

$y_1 = 5.0576$

$x_1 = 1.02$

$y' = \frac{y}{e^x - 1}$ $\quad x_1 = 1.02 \quad h = 0.02$

$y_1 = 5.0576$

$y_2 = y_1 + h T_4(x_1, y_1, h) = 5.0576 + \frac{0.02}{6}(1.02, 5.0576, 0.02)$

$k_1 = (1.02, 5.0576) = \frac{5.0576}{e^{1.02} - 1} = 2.8523$

$k_2 = (x_1 + \frac{h}{2}, y + \frac{h}{2} k_1) = (1.02 + \frac{0.02}{2}, 5.0576 + \frac{0.02}{2}(2.8523))$

$= (1.03, 5.0861) = \frac{5.0861}{e^{1.03} - 1} = 2.8239$

$k_3 = (x_1 + \frac{h}{2}, y + \frac{h}{2} k_2) = (1.02 + \frac{0.02}{2}, 5.0576 + \frac{0.02}{2}(2.8239))$

$= (1.03, 5.0858) = \frac{5.0858}{e^{1.03} - 1} = 2.8238$

$k_4 = (x_1 + h, y + h k_3) = (1.02 + 0.02, 5.0576 + 0.02(2.8238))$

$= (1.04, 5.1141) = \frac{5.1141}{e^{1.04} - 1} = 2.7958$

$y_2 = 5.0576 + \frac{0.02}{6}(2.8523 + 2(2.8239) + 2(2.8238) + 2.7958)$

$y_2 = 5.1141$

$x_2 = 1.04$

$y' = \frac{y}{e^x - 1}$ $x_2 = 1.04$ $h = 0.02$
$y_2 = 5.1141$

$y_3 = y_2 + h T_4(x_2, y_2, h) = 5.1141 + \frac{0.02}{6}(1.04, 5.1141, 0.02)$

$k_1 = (1.04, 5.1141) = \frac{5.1141}{e^{1.04} - 1} = 2.7958$

$k_2 = (x_2 + \frac{h}{2}, y_2 + \frac{h}{2} k_1) = (1.04 + \frac{0.02}{2}, 5.1141 + \frac{0.02}{2}(2.7958))$
$= (1.05, 5.1421) = \frac{5.1421}{e^{1.05} - 1} = 2.7681$

$k_3 = (x_2 + \frac{h}{2}, y_2 + \frac{h}{2} k_2) = (1.04 + \frac{0.02}{2}, 5.1141 + \frac{0.02}{2}(2.7681))$
$= (1.05, 5.1418) = \frac{5.1418}{e^{1.05} - 1} = 2.7679$

$k_4 = (x_2 + h, y_2 + h k_3) = (1.04 + 0.02, 5.1141 + 0.02(2.7679))$
$= (1.06, 5.1695) = \frac{5.1695}{e^{1.06} - 1} = 2.7404$

$y_3 = 5.1141 + \frac{0.02}{6}(2.7958 + 2(2.7681) + 2(2.7679) + 2.7404)$

$y_3 = 5.1695$
$x_3 = 1.06$

$y' = \frac{y}{e^x - 1}$ $\quad x_3 = 1.06 \quad h = 0.02$

$y_3 = 5.1695$

$y_4 = y_3 + h T_4(x_3, y_3, h) = 5.1695 + \frac{0.02}{6}(1.06, 5.1695, 0.02$

$k_1 = (1.06, 5.1695) = \frac{5.1695}{e^{1.06} - 1} = 2.7404$

$k_2 = (x_3 + \frac{h}{2}, y_3 + \frac{h}{2} k_1) = (1.06 + \frac{0.02}{2}, 5.1695 + \frac{0.02}{2}(2.7404))$

$= (1.07, 5.1969) = \frac{5.1969}{e^{1.07} - 1} = 2.7132$

$k_3 = (x_3 + \frac{h}{2}, y_3 + \frac{h}{2} k_2) = 1.06 + \frac{0.02}{2}, 5.1695 + \frac{0.02}{2}(2.7132))$

$= (1.07, 5.1966) = \frac{5.1966}{e^{1.07} - 1} = 2.7131$

$k_4 = (x_3 + h, y_3 + h k_3) = (1.06 + 0.02, 5.1695 + 0.02(2.7131))$

$= (1.08, 5.2238) = \frac{5.2238}{e^{1.08} - 1} = 2.6862$

$y_4 = 5.1695 + \frac{0.02}{6}(2.7404 + 2(2.7132) + 2(2.7131) + 2.6862)$

$y_4 = 5.2238$

$x_4 = 1.08$

$y' = \frac{y}{e^x - 1}$ $x = 1.08$ $h = 0.02$

$y = 5.2238$

$$y_5 = y_4 + h T_4(x_4, y_4, h) = 5.2238 + \frac{0.02}{6}(1.08, 5.2238, 0.02)$$

$$k_1 = (1.08, 5.2238) = \frac{5.2238}{e^{1.08} - 1} = 2.6862$$

$$k_2 = (x_4 + \tfrac{h}{2}, y_4 + \tfrac{h}{2} k_1) = (1.08 + \tfrac{0.02}{2}, 5.2238 + \tfrac{0.02}{2}(2.6862))$$

$$= (1.09, 5.2507) = \frac{5.2507}{e^{1.09} - 1} = 2.6596$$

$$k_3 = (x_4 + \tfrac{h}{2}, y_4 + \tfrac{h}{2} k_2) = (1.08 + \tfrac{0.02}{2} + 5.2238 + \tfrac{0.02}{2}(2.6596))$$

$$= (1.09, 5.2504) = \frac{5.2504}{e^{1.09} - 1} = 2.6594$$

$$k_4 = (x_4 + h, y_4 + h k_3) = (1.08 + 0.02, 5.2237 + 0.02(2.6594))$$

$$= (1.1, 5.2770) = \frac{5.2770}{e^{1.1} - 1} = 2.6330$$

$$y_5' = 5.2238 + \frac{0.02}{6}(2.6862 + 2(2.6596) + 2(2.6594) + 2.6330)$$

$y_5 = 5.2770$

$x_5 = 1.1$