

# Quiz #6

$$\begin{cases} y' = -y + t + 1 \\ y(0) = 1 \end{cases} \quad D = -1 \quad \text{exact: } y(t) = t + e^{-t}$$

$$t^n = \ln(3)$$

$$h = \ln(2)$$

$$y' = -y + t + 1$$

$$y' + y = t + 1$$

$$\frac{1}{D+1}(t+1) = (1-0)(t+1) \Rightarrow t+1-1=t$$

$$y(t^n) = y(\ln(3)) = e^{-\ln(3)} + \ln(3) = \frac{1}{3} + \ln(3)$$

$$y(t^{n+1}) = y(t^n + h) = y(\ln(6)) \Rightarrow e^{-\ln(6)} + \ln(6) \Rightarrow \frac{1}{6} + \ln(6)$$

so,

$$y(f^n) + h(f(f^n, y(f^n)) - y(f^{n+1}))$$

$$\Rightarrow \frac{1}{3} + \ln(3) + \ln(2) \cdot (f(\ln(3); \frac{1}{3} + \ln(3))) - (\frac{1}{6} + \ln(6))$$

$$\Rightarrow \frac{1}{3} + \ln(3) + \ln(2) \cdot \frac{2}{5} - \frac{1}{6} - \ln(6) \boxed{\begin{aligned} & \frac{1}{2} - \frac{1}{3} \ln(2) \\ & \frac{1}{3} \left( \frac{1}{2} - \ln(2) \right) \end{aligned}}$$