

5. Use Euler's method to find an approximate solution to the initial value problem (10 pts)

$$\begin{cases} y' = y^2 + t \\ y(0) = 0 \end{cases}$$

at $t = .2$. Use step size $h = .1$.

ANS.

0.01

$$y_{n+1} = f(t_n, y_n)h + y_n \quad \text{Euler Method (5 pts)}$$

$$\Rightarrow y_{n+1} = (y_n^2 + t_n)h + y_n$$

n	t	y
0	0	0
1	0.1	$y_1 = (y_0^2 + t_0) \cdot 0.1 + y_0 = (0 + 0) \cdot 0.1 + 0 = 0$
2	0.2	$y_2 = (y_1^2 + t_1) \cdot 0.1 + y_1 = (0^2 + 0.1) \cdot 0.1 + 0 = 0.01$

(5 pts)