

Akpon Nwison Paul

Mechatronics ENIGER

16/ENG-05/009

ENIG 282

Assignment

a) $\bar{DE} = \frac{1}{2} B\bar{C}$

For modeling

$$\frac{dy}{dt} \propto y$$

$$\frac{dy}{dt} = ky \quad \dots \quad \text{ODE}$$

b) $y = ce^{kt}$... (equ 1)

b) $y_{\text{cos}} = 20$

$$20 = ce^{k \times 0}$$

$$20 = c$$

Substituting Value for c back into equ (1)

$$y = 20 e^{kt}$$

$$40 = 20 e^{k \times 5}$$

$$e^{5k} = 2$$

$$5k = \ln 2$$

$$k = \frac{\ln 2}{5} = 0.1386$$

Population of bacteria for 1 1/2 days

$$k = \frac{\ln 2}{5} = 0.1386$$

$$y = 20 e^{0.1386 t}$$

$$y = 20 \times e^{0.1386 \times 36}$$

$$y = 293.6$$

c) en Excel - documents

d) $Y_i = 20e^{nt}$

$$Y_{10} = 10 e^{0.1386t}$$

$$Y_{30} = 30 e^{0.1386t}$$

$$Y_{50} = 50 e^{0.1386t}$$