

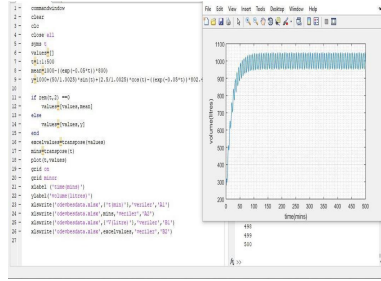
$$\int \frac{e^{-0.025t}}{1.000625} (0.025 \cos t - 0.025 \sin t + 0.025) dt$$

$$\int \frac{e^{-0.025t}}{1.000625} (0.025 \cos t + 0.025 \sin t + 0.025) dt$$

$$\int \frac{e^{-0.025t}}{1.000625} (0.025 \cos t + 0.025 \sin t + 0.025) dt$$

$$= \frac{e^{-0.025t}}{1.000625} (0.025 \cos t + 0.025 \sin t + 0.025) + C$$

$$R = \frac{e^{-0.025t}}{1.000625} (0.025 \cos t + 0.025 \sin t + 0.025) + C$$



From

$$\frac{dy}{dt} = y_{in} - y_{out}$$

$$\frac{dy}{dt} = 50(1 + \sin t) - 2.5y$$

$$\frac{dy}{dt} + 0.025y = 50(1 + \sin t)$$

M.B.S by dt

$$\int (0.025y + 50(1 + \sin t)) dt = \int 50(1 + \sin t) dt$$

$$1 + 0.025y dy = 50(1 + \sin t) dt$$

$$\frac{dy}{dt} = 50(1 + \sin t) - 2.5y$$

$$\frac{dy}{dt} + 0.025y = 50(1 + \sin t)$$

$$y = 4000t + 4000 \cos t + 800$$

$$y = 4000t + 4000 \cos t + 800$$

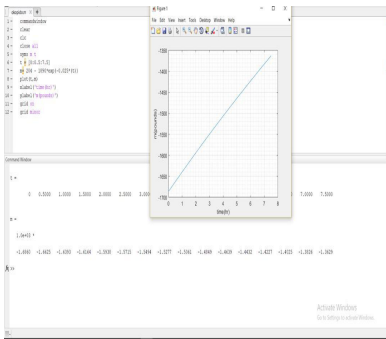
From $\frac{dy}{dt} = y_{in} - y_{out}$

$$\frac{dy}{dt} = 50(1 + \sin t) - 2.5y$$

$$\frac{dy}{dt} + 0.025y = 50(1 + \sin t)$$

$$y = 4000t + 4000 \cos t + 800$$

$$y = 4000t + 4000 \cos t + 800$$



$$y = 2000 - 50 \frac{(0.025 \cos t - 0.025 \sin t) + 0.025}{0.000625}$$

when $y = 150$

$$150 = 2000 - 50 \frac{(1-0) + 0.025}{1.000625}$$

$$150 = 2000 - 49.965(1) + 50C$$

$$150 = 1950.032 + 50C$$

$$-150 = 0.032 + 50C$$

$$C = -36.0006$$

$$y = 2000 - 50 \frac{(0.025 \cos t - 0.025 \sin t) + 0.025}{1.000625}$$

$$y = 2000 - 50 \frac{(0.025 \cos t - 0.025 \sin t) + 0.025}{1.000625}$$

$$y = 2000 - 50 \frac{(0.025 \cos t - 0.025 \sin t) + 0.025}{1.000625}$$

