Problem 07 - System Simulation

- Tyler Mathews
3/5/19

A) $\dot{x} = 10(y-x)$
$\dot{y} = -xz + 28x - y$
$\dot{z} = xy - \frac{8}{3}z$

equilibrium points at $\dot{x}=\dot{y}=\dot{z}=0$

$\dot{x}$: $0 = 10y - 10x \Rightarrow y = x$

$\dot{y}$: $0 = -xz + 28x - y = -xz + 28x - x \Rightarrow -xz + 27x = 0$ $\quad xz = 27x$ $\quad 27 = z$

$\dot{z}$: $0 = xy - \frac{8}{3}z$ $\quad 0 = x^2 - (\frac{8}{3})(27)$ $\quad x = \pm\sqrt{72} \Rightarrow x = y = \pm 8.485$ $\quad z = 27$

$(0, 0, 0)$

$(8.485, 8.485, 27)$

$(-8.485, -8.485, 27)$