Mathematics 172

Quiz 3 Name: Key

You must show your work to get full credit.

Consider a model

$$\Delta P = 1.2P_t\left(1-\frac{P}{20}\right), \qquad P_0 = 10$$

1. Rewrite this in the form $P_{t+1} = f(P_t)$.

$\Delta P = P_{t+1} - P_t = 1.2P_t\left(1-\frac{P_t}{20}\right)$ $\quad P_{t+1} = P_t + 1.2P_t\left(1-\frac{P_t}{20}\right)$

$P_{t+1} = P_t + 1.2P_t\left(1-\frac{P_t}{20}\right)$

2. Find the following

$P_1 = 16.00$

$P_2 = 19.84$

$P_3 = 20.3$

$P_1 = P_0 + 1.2P_0\left(1-\frac{P_0}{20}\right)$

$= 10 + (1.2)(10)\left(1-\frac{10}{20}\right) = 16$

$P_2 = 16 + (1.2)(16)\left(1-\frac{16}{20}\right) = 19.84$

$P_3 = 19.84 + (1.2)(19.84)\left(1-\frac{19.84}{20}\right) = 20.03$

3. If $P = 25$ is ΔP positive or negative (circle one).

If $P = 25$

$\Delta P = 1.2P\left(1-\frac{P}{20}\right) = 1.2(25)\left(1-\frac{25}{20}\right)$ is negative

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