

Quiz 32

A population is growing logistical with $r = .3$ and $K = 200$. If we start harvesting 20% of the population what is the new stable population size?

$$\frac{dN}{dt} = \underbrace{.3N \left(1 - \frac{N}{200}\right)}_{\text{logistic with } r = .3, K = 200} - \underbrace{.2N}_{\text{20\% of population size}}$$

set $\frac{dN}{dt} = 0$

$$\frac{dN}{dt} = N \left(.3 \left(1 - \frac{N}{200} \right) - .2 \right) = 0$$

$N \neq 0$ so we have

$$.3 \left(1 - \frac{N}{200} \right) - .2 = 0$$

$$.3 - \frac{.3N}{200} - .2 = 0$$

$$-\frac{.3N}{200} = -.1$$

$$N = \frac{.1}{.3} 200 = 66.67$$

66.67

so it is stable