

MTH 370, Fall 2009
Homework 5

Instructions: Do these calculations by hand (you may use a computer or calculator for simple arithmetic and function evaluations) and show your work.

1. Suppose that a population of hosts and parasitoids follow the Nicholson-Bailey equations except that in each generation a fraction $p < 1$ of the hosts have a safe refuge from attack. Thus the equations become

$$\begin{aligned}x_{n+1} &= re^{-ay_n}(1-p)x_n + rpx_n \\y_{n+1} &= cr(1 - e^{-ay_n})(1-p)x_n\end{aligned}$$

- (a) Find the fixed points and determine their stability. You may assume that $rp \neq 1$.
- (b) Can this strategy of the hosts stabilize the nonzero fixed point?