

Math 1180: Birth-Death Assignment
Due on March 22

Consider an immigration-death process, where immigrants arrive at rate λ and an individuals die at per capita rate μ .

- a. Sketch some sort of diagram of this process.
- b. Write a single deterministic differential equation for a population that follows these rules and find the equilibrium.
- c. Find a differential equation for p_0 , the probability the population is extinct (because of immigration, extinction is not forever for this population).
- d. Find differential equations for p_1 , p_2 and p_3 .
- e. Solve for the equilibrium value of p_1 in terms of p_0 .
- f. Solve for the equilibrium value of p_2 in terms of p_0 .
- g. Solve for the equilibrium value of p_3 in terms of p_0 .
- h. What do you think the equilibrium distribution might be?