HW2

Robert Saldivar

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library(tidyverse) #loading the tidyverse package

## Warning: package 'tidyverse' was built under R version 3.5.3

## Warning: package 'ggplot2' was built under R version 3.5.3

## Warning: package 'tibble' was built under R version 3.5.3

## Warning: package 'tidyr' was built under R version 3.5.3

## Warning: package 'readr' was built under R version 3.5.3

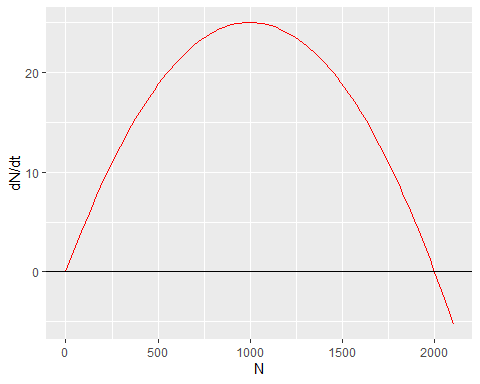
## Warning: package 'purrr' was built under R version 3.5.3

## Warning: package 'dplyr' was built under R version 3.5.3

## Warning: package 'stringr' was built under R version 3.5.3

## Warning: package 'forcats' was built under R version 3.5.3

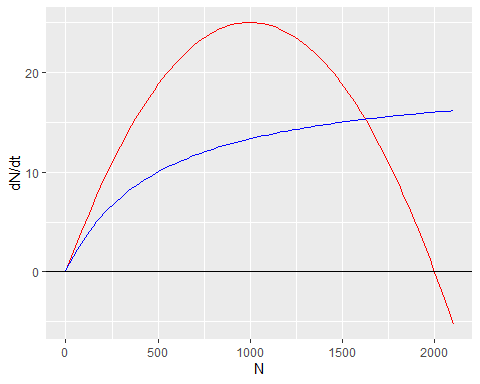
# plotting the function  
  
#loading the variables of the function  
r <- 0.05  
K <- 2000  
P <- 4  
a <- 0.01  
h <- 0.2  
f <- function(N) r \* N \* (1 - N/K) # Here is defined the function  
  
fun <- ggplot(data.frame(N = 0:2100), aes(x = N)) +  
 stat\_function(fun = f, color ="red") +  
 geom\_hline(yintercept = 0) +  
 ylab("dN/dt")  
  
fun



1. Based on the graph there are two equilibria for this population. There is an unstable equilibria when the population equals 0 and a stable equilibria when the population equals 2000.

5a.

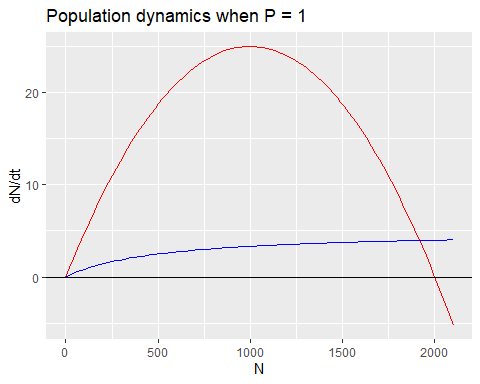
fp <- function(N) P \* ((a \* N)/(1 + a \* h \* N)) #This defines the hunting rate  
  
fun\_p <- ggplot(data.frame(N = 0:2100), aes(x = N)) +  
 stat\_function(fun = f, color ="red") +  
 stat\_function(fun = fp, color = "blue") +  
 geom\_hline(yintercept = 0) +  
 ylab("dN/dt")  
  
fun\_p



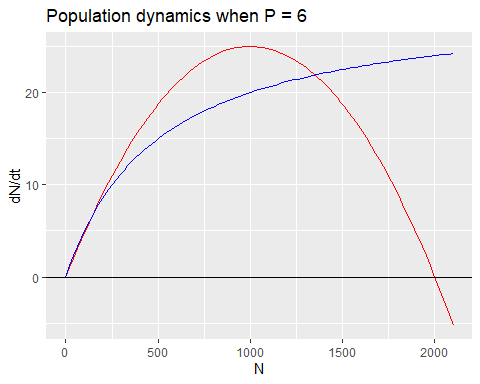
5b.

5c.

P <-1 #This will set the P value to 1 for the following function  
  
fun\_p1 <- ggplot(data.frame(N = 0:2100), aes(x = N)) +  
 stat\_function(fun = f, color ="red") +  
 stat\_function(fun = fp, color = "blue") +  
 geom\_hline(yintercept = 0) +  
 ylab("dN/dt") +  
 ggtitle("Population dynamics when P = 1")  
  
fun\_p1



P <- 6 #This will set the P value to 6 for the following function  
  
fun\_p6 <- ggplot(data.frame(N = 0:2100), aes(x = N)) +  
 stat\_function(fun = f, color ="red") +  
 stat\_function(fun = fp, color = "blue") +  
 geom\_hline(yintercept = 0) +  
 ylab("dN/dt") +  
 ggtitle("Population dynamics when P = 6")  
  
fun\_p6



7a.

7b.

7c.

8a.

8b.

8c.