EXAM 2 QUESTION 1C

library(deSolve)

zombie <- function(t, y, p) {

H <- y[1]

Z <- y[2]

with(as.list(p), {

dH.dt <- (r\*H\*(1-H/K)-b\*H\*Z)

dZ.dt <- (c\*H\*Z-m\*Z)

return(list(c(dH.dt, dZ.dt)))

})

}

t<-1:100

y0 <- c('H' = 1, 'Z' = 1)

p<-c('r'=1,'K'=1,'b'=1,'c'=1,'m'=0.1)

sim<-ode(y=y0,times=t,func=zombie,parms=p,method='lsoda')

sim<-as.data.frame(sim)

plot(H~time,data=sim,type='l',col='blue',ylim=c(0,2))

points(Z~time, data=sim,type='l',col='red')

legend(60, 2.4, c('Humans', 'Zombies'), lty = c(1, 1), col = c('blue', 'red'), bty = 'n')

EXAM 2 QUESTION 2

zombie.parasite <- function(t, y, p) {

H <- y[1]

Z <- y[2]

P<-y[3]

with(as.list(p), {

dH.dt <- (r\*H\*(1-H/K)-b\*H\*Z)

dZ.dt <- (c\*H\*Z-m\*Z-d\*Z\*P)

dP.dt<-(e\*Z\*P-n\*P)

return(list(c(dH.dt, dZ.dt,dP.dt)))

})

}

t<-1:100

y0 <- c('H' = 1, 'Z' = 1, 'P' = 0.1)

p<-c('r'=1,'K'=1,'b'=1,'c'=1,'m'=0.1,'d'=1,'e'=1,'n'=0.1)

sim<-ode(y=y0,times=t,func=zombie.parasite,parms=p,method='lsoda')

sim<-as.data.frame(sim)

plot(H~time,data=sim,type='l',col='blue',ylim=c(0,3))

points(Z~time, data=sim,type='l',col='red')

points(P~time,data=sim,type='l',col='green')

legend(60, 3.4, c('Humans', 'Zombies','Parasite'), lty = c(1, 1, 1), col = c('blue', 'red', 'green'), bty = 'n')