*Question 3: changing inputs*

*b) Repeat question 2 when the probabilities of any customer making a claim are 0.05, 0.055, 0.06, …., 0.15. Plot a graph showing how the probability of bankruptcy varies with the probability of making a claim.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **p(individual claim)** | **p(bankruptcy)** |  | **p(individual claim)** | **p(bankruptcy)** |
| 0.050 | 0.0012 |  | 0.105 | 0.1481 |
| 0.055 | 0.001 |  | 0.110 | 0.2067 |
| 0.060 | 0.0031 |  | 0.115 | 0.28 |
| 0.065 | 0.0044 |  | 0.120 | 0.3742 |
| 0.070 | 0.0069 |  | 0.125 | 0.4639 |
| 0.075 | 0.0109 |  | 0.130 | 0.5642 |
| 0.080 | 0.0154 |  | 0.135 | 0.6486 |
| 0.085 | 0.0242 |  | 0.140 | 0.7314 |
| 0.090 | 0.0392 |  | 0.145 | 0.8183 |
| 0.095 | 0.0641 |  | 0.150 | 0.8752 |
| 0.100 | 0.0939 |  |  |  |

##Program for variable probability

assets<-250000

p<-0.05 # initial probability that a customer makes a claim

n<-1000 # no of customers

z<-6000 # premium

w<-0

#define parento distribution parameters alpha (a) and beta (B)

a<-3

b<-100000 #parento parameters

#success or failure implies that x is a binomial function

### set the number of simulations

N=10000

#set the loop for the variable probability of claim

for(j in 0:20)

{

#set the loop

for(i in 1:N)

{

x=rbinom(1, n, p)

#x is the number of claims made in a year

U=runif(x)

claim<-(((b^a)/(1-U))^(1/a)-b)

claim

d<-sum(claim)

w[i]<-(assets+n\*z-d)

}

#define q as a vector containing the results of the simulation

q<-c(w[1:N])

#count the number of times the insurance company will go bankrupt

count=0

for (i in 1:N)

{

if (q[i]<0) {

count = count + 1

}

}

# probability of bankruptcy

pbankrupt[j]<-count/N

#Print the probability of bankruptcy with the corresponding probability of making a claim

print(p)

print(count/N)

#reassign next value of the probability p

p<-p+0.005

}