

# Homework 6

Bright

3/2/2021

```
library(igraph)

##
## Attaching package: 'igraph'
##
## The following objects are masked from 'package:stats':
##
##     decompose, spectrum
##
## The following object is masked from 'package:base':
##
##     union

n=1000
p=(-2*log(0.5))/(n-1)# from homework 5
d5nodes=0 # represents number of degree 5 nodes
d5nodesG = 0 #represents the number degree 5 nodes in the giant component

fraction_d5=rep(0,100)

#the total number of degree 5 nodes in the G(n,p) model
for (j in 1:100){

  g <- erdos.renyi.game(n, p, type = "gnp")
  for (i in 1:n){

    if (degree(g)[i]==5)

      d5nodes=d5nodes+1

  }

  #the total number of degree 5 nodes in the Giant component.
  comp = components(g)
  vals = 0
  for(i in 1:length(comp$size)){

    if(comp$size[i]==max(comp$size))
      vals=i

  }
  vals
```

```

for (i in 1:n){

  if (comp$membership[i]==vals)
    if (degree(g)[i]==5)
      d5nodesG = d5nodesG+1
}

fraction_d5[j]=d5nodesG/d5nodes
}

fraction_d5

##      [1] 0.9090909 0.9411765 0.9333333 0.9459459 0.9649123 0.9696970 0.9589041
##      [8] 0.9638554 0.9550562 0.9574468 0.9380531 0.9421488 0.9393939 0.9420290
##     [15] 0.9470199 0.9503106 0.9537572 0.9388889 0.9427083 0.9460784 0.9473684
##     [22] 0.9513274 0.9531915 0.9558233 0.9570312 0.9589552 0.9614035 0.9627119
##     [29] 0.9647436 0.9657321 0.9608434 0.9615385 0.9598854 0.9610028 0.9629630
##     [36] 0.9642857 0.9625000 0.9637681 0.9651972 0.9639640 0.9626374 0.9591398
##     [43] 0.9601677 0.9592668 0.9580000 0.9571150 0.9584121 0.9574074 0.9577982
##     [50] 0.9569892 0.9561404 0.9568221 0.9574106 0.9577703 0.9568106 0.9576547
##     [57] 0.9580645 0.9585327 0.9578783 0.9587786 0.9596413 0.9572901 0.9579100
##     [64] 0.9585714 0.9591549 0.9567039 0.9572414 0.9575342 0.9582210 0.9588313
##     [71] 0.9593176 0.9558442 0.9564661 0.9567980 0.9572864 0.9577640 0.9568966
##     [78] 0.9573171 0.9580336 0.9573460 0.9566237 0.9572254 0.9578588 0.9573991
##     [85] 0.9581498 0.9587405 0.9570815 0.9545455 0.9550679 0.9544513 0.9549180
##     [92] 0.9554656 0.9539540 0.9544554 0.9549461 0.9552093 0.9556840 0.9551527
##     [99] 0.9556185 0.9553073

```