**Discrete Probability Distribution**

#Install package

install.packages("stats")

#To remove package after use

**detach**("stats", unload = TRUE)

#Load library to load and use package

library(e1071)

library(distr)

#Prefix used

* p for "probability", the cumulative distribution function (c. d. f.)
* q for "quantile", the inverse c. d. f.
* d for "density", the density function (p. f. or p. d. f.)
* r for "random", a random variable having the specified distribution

#Frequency table

random=sample(1:10, size=1000, replace = TRUE)

t=table(random)

barplot(t)

#How to enter data

rdiscrete( 30, c(‘0.2’,’0.5’,’0.3’) )

rdiscrete( 100, c(‘0.2’,’0.5’,’0.3’), c(“A”,”B”,”C”))

#Example

y= rdiscrete( 100, c(1/4,2/4,1/4), c(0,1,2))

factor(y)

levels(factor(y))

table((factor(y)))

#To find probability associated to any random variable for example x=1

ddiscrete(1, c(1/4,2/4,1/4), c(0,1,2))

#Example of rolling of die

*# generate the vector of probabilities*

probability <- **rep**(1**/**6, 6)

*# plot the probabilities*

**barplot**(probability, xlab = "outcomes", main = "Probability Distribution")

*# generate the vector of cumulative probabilities*

cum\_probability <- **cumsum**(probability)

*# plot the probabilites*

**barplot**(cum\_probability, xlab = "outcomes", main = "Cumulative Probability Distribution")

Note: Plots must be customized by using the knowledge of Practical 2.

#Mean and variance

X=c(0,1,2,3,4)

P=c(0.1,0.15,0.2,0.55)

XP=X\*P

data.frame(X,P,XP)

mean=sum(XP)

#Find unknown for 0.6+6x=1

f <- function(x) (0.6+6\*x-1)

uniroot(f, lower=0, upper=1)$root

EXERCISE (Programing and problem solving)

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| 1. PDF of random variable X is:  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | X | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | P(X) | k | 2k | 3k | k2 | k2+k | 2k2 | 4k2 |   Find  Write a R program for the above problem. Also write a R program to plot probability distribution.   1. A random variable X has the following pdf  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | X | -2 | -1 | 0 | 1 | 2 | 3 | | P(X) | 0.1 | k | 0.2 | 2k | 0.3 | 3k |   Find k, p(X <2), c.d.f.  Write a R program for the above problem. Also write a R program to plot cumulative distribution function.   1. A RV X has the following probability distribution:  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | X | -2 | -1 | 0 | 1 | 2 | | P(X=x) | 1/5 | 1/5 | 2/5 | 2/15 | 1/15 |   Find the probability distribution of .  Write a R program for the above problem.   1. Given the following distribution:  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | x | -3 | -2 | -1 | 0 | 1 | 2 | | P(X=x) | 0.05 | 0.1 | 0.2 | 0.3 | 0.2 | 0.15 |   Find Mean and Variance.  Write a R program for the above problem.   1. An urn contains 7 white and 3 red balls. Two balls are drawn together, at random from this urn. Compute the expected number of white balls drawn   Write a R program for above problem. Also write a program for to plot probability distribution and cumulative probability distribution. |
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