# Package 'TRIANG'

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**Type** Package

**Title** Discrete triangular distributions

**Version** 1.1

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**Description** This is a package for discrete triangular distributions which complete the classical discrete distributions like binomial, Poisson and Negative binomial.

**License** GPL-2

**Repository** CRAN

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## R topics documented:



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`dtrg` *Discrete triangular distributions*

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### Description

The function plots discrete triangular distributions

### Usage

```
dtrg(c, a, h, y)
```

## Arguments

| | |
|---|---|
| c | The center $c$ is an integer |
| a | The arm $a$ is a non-negative integer |
| h | The order $h$ is a positive real number |
| y | The vector of observations |

## Details

The discrete triangular distribution have probability mass functions

$P(y) = ((a+1)\hat{}h - (abs(y-c))\hat{}h)/A$

where $A = (2*a+1)*(a+1)\hat{}h - 2*sum(k\hat{}h), k = 1, 2, ..., a$, is the normalizing constant. The mean is equal to $c$ and the variance is given by $V(a,h) = (1/A)(a(2*a+1)(a+1)\hat{}(h+1))/3 - 2*sum(k\hat{}h), k = 0, 1, 2, ..., a$.

## Value

The value returned is a vector of numbers in the interval [0,1]

## Author(s)

Tristan Senga Kiessé, Silvio S. Zocchi, Célestin C. Kokonendji

## References

Kokonendji, C.C., Senga Kiessé, T. and Zocchi, S.S. (2007). Discrete triangular distributions and non-parametric estimation for probability mass function. Journal of Nonparametric Statistics 19, 241–254.

## Examples

```
##These examples provide some discrete triangular distributions of order
## h  in {1/12, 1/2, 1, 2, 12} centered in c=5 with arm a=4 .
y=0:10
a=4
c=5
h=12
T12=dtrg(c,a,h,y)
h=2
T2=dtrg(c,a,h,y)
h=1
T1=dtrg(c,a,h,y)  ##The case h=1 provides a discrete triangular distribution
##said to be pyramidal
h=1/2
T_05=dtrg(c,a,h,y)
h=1/12
T_012=dtrg(c,a,h,y)
plot(y,T1,xlab="y",ylab="Probab(y)",xlim=c(0,11),ylim=c(0,0.7),
main="Some Discrete triangular distributions centered in c=y=5 with arm a=4",cex.lab=1.5,
cex.axis=1.5,pch=20)
```

```
lines(y,T1,pch=20,lty=1)
points(y,T_012,pch=17)
lines(y,T_012,lty=1)
points(y,T2)
lines(y,T2,lty=2)
points(y,T12)
lines(y,T12, lty=1)
points(y,T_05, pch=17)
lines(y,T_05,lty=2)
op <- par(bg="white")
legend(8,0.7,c("h=1/12", "h=1/2","h=1",  "h=2", "h=12"),pch=c(17,17,20,1,1),
lty=c(1,2,1,2,1),cex = 1.2)
par(op)
## The function is defined as
function(c,a,h,y){  T=rep(0,length(y));

 if (a==0)
 {
    {for (j in 1:length(y))             # Loop in j for each observation y

      {if (y[j]==c)
        T[j]= 1  # Dirac distribution at c

       else{
           T[j]=0
            }
      }
    }
  }


else
{
if (h==0)
 {
    {for (j in 1:length(y))             # Loop in j for each observation y

      {if (y[j]==c)
        T[j]= 1  # Dirac distribution at c

       else{
           T[j]=0
            }
      }
    }
  }

else if (h==Inf)
 {
    {for (j in 1:length(y))             # Loop in j for each observation y

      {if (y[j]>=(c-a) & y[j]<=(c+a))   #  Support {c-a,...,c,...c+a}
        T[j]= 1/(2*a+1)  # Discrete uniform distribution
```

```
          else{
              T[j]=0
               }
         }
       }
     }


   else
  { u=0

   {for (k in 1:a)

     {
      u=u+k^h
      }

     }

    A=(2*a+1)*(a+1)^h-2*u                # Normalizing constant

   {for (j in 1:length(y))             # Loop in j for each observation y

        {if (y[j]>=(c-a) & y[j]<=(c+a))   #  Support {c-a,...,c,...c+a}
          T[j]= ((a+1)^h - (abs(y[j]-c))^h)/A  # Discrete triangular distribution



          else{
              T[j]=0
               }
         }
       }
   }

  }

   return(T)
  }
```

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TRIANG *Discrete triangular distributions*

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## Description

The function plots discrete triangular distributions

## Details

| | |
|---|---|
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| Type: | Package |
| Version: | 1.1 |
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## References

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