Package 'TRIANG'

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Type Package

Title Symmetric discrete triangular distributions

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Description This is a package for symmetric discrete triangular distributions

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LazyLoad yes

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`dtrg` *Symmetric discrete triangular distributions*

Description

The function plots symmetric discrete triangular distributions

Usage

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

Arguments

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

Details

The symmetric discrete triangular distribution has the probability mass function

$$ Pr(Y=y) = [(a+1)^h - {abs(y-c)}^h]/A $$

where $ A=(2a+1)(a+1)^h-2sum_k=1^ak^h$ is the normalizing constant. The mean is equal to c and the variance is given by $V(a,h)=(1/A){a(2a+1)(a+1)^h+1/3 - 2sum_k=1^ak^h+2}.$

Value

The function returns probability mass function in [0,1] of the corresponding y value.

Author(s)

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References

Kokonendji, C.C. and Zocchi, S.S. (2010). Extensions of discrete triangular distributions and boundary bias in kernel estimation for discrete functions. Statistics and Probability Letters, 80, 1655–1662.

Kokonendji, C.C., Senga Kiess\'e, T. and Zocchi, S.S. (2007). Discrete triangular distributions and non-parametric estimation for probability mass function. Journal of Nonparametric Statistics 19, 241–254.

See Also

'dtrgg' for the general discrete triangular distribution

Examples

```
##These examples provide some symmetric 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="Symmetric discrete triangular distributions centered in c=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 currently 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)& y[j]==as.integer(y[j]))
          # 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) & y[j]==as.integer(y[j]))
          # Support {c-a,...,c,...c+a}

T[j]= ((a+1)^h - (abs(y[j]-c))^h)/A
   # Symmetric discrete triangular distribution



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

  }
```

```
    return(T) }
```

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