# Package: DTS (via r-universe)

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**Title** Discrete Tempered Stable Distributions

**Version** 0.1.1

**Description** Methods for evaluating the probability mass function, cumulative distribution function, and generating random samples from discrete tempered stable distributions. For more details see Grabchak (2021) <doi:10.1007/s11009-021-09904-3>.

**License** GPL (>= 3)

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**Repository** https://sabasina22.r-universe.dev

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ddts *The probability mass function of the discrete tempered stable distribution.*

## Description

The probability mass function of the discrete tempered stable distribution.

## Usage

```
ddts(x, alpha, eta, tp = c(1, 1), tf = "poisson-tweedie", zt = FALSE)
```

## Arguments

| | |
|---|---|
| x | vector of points. |
| alpha | Index of stability; Number in (0,1) |
| eta | A parameter, eta>0. |
| tp | A vector of tempering parameters. |
| tf | Tempering function. It can be one of the "discrete-stable", "discrete-truncated-stable", "discrete-pRDTS", "poisson-tweedie", "exp-tempering", "beta-prime-tempering", "Pareto-tempering". |
| zt | Logical. If True it calculates zero-truncated probabilities. |

## Value

A vector of probabilities.

## References

M. Grabchak. Discrete tempered stable distributions. Methodology and Computing in Applied Probability, 24(3):1877-1890, 2021.

## Examples

```
x <- 0:10
ddts(x, 0.5, 1)
```

edts *Log-likelihood function for a discrete tempered stable distribution.*

## Description

Log-likelihood function for a discrete tempered stable distribution.

## Usage

```
edts(pv, smpl, tf = "poisson-tweedie", zt = FALSE)
```

## Arguments

| | |
|---|---|
| pv | A vector of parameters. |
| smpl | A sample data to be used for estimation. |
| tf | Tempering function. It can be one of the "discrete-stable", "discrete-truncated-stable", "discrete-pRDTS", "poisson-tweedie", "exp-tempering", "beta-prime-tempering", "Pareto-tempering". |
| zt | Logical. If True it calculates zero-truncated probabilities. |

## Value

A number. Negative of likelihood function.

## References

M. Grabchak. Discrete tempered stable distributions. Methodology and Computing in Applied Probability, 24(3):1877-1890, 2021.

## Examples

```
pv <- c(0.5, 1, 1)
n <- 100
smpl <- rdts(n, 0.5, 1)
edts(pv, smpl)
```

pdts *The probability distribution of the discrete tempered stable distribution.*

## Description

The probability distribution of the discrete tempered stable distribution.

## Usage

```
pdts(x, alpha, eta, tp = c(1, 1), tf = "poisson-tweedie", zt = FALSE)
```

## Arguments

| | |
|---|---|
| x | vector of points. |
| alpha | Index of stability; Number in (0,1) |
| eta | A parameter, eta>0. |
| tp | A vector of tempering parameters. |
| tf | Tempering function. It can be one of the "discrete-stable", "discrete-truncated-stable", "discrete-pRDTS", "poisson-tweedie", "exp-tempering", "beta-prime-tempering", "Pareto-tempering". |
| zt | Logical. If True it calculates zero-truncated probabilities. |

## Value

A vector of numbers.

## References

M. Grabchak. Discrete tempered stable distributions. Methodology and Computing in Applied Probability, 24(3):1877-1890, 2021.

## Examples

```
x <- 0:10
pdts(x, 0.5, 1)
```

`rdts` *Simulation from a discrete tempered stable distribution.*

## Description

Simulation from a discrete tempered stable distribution.

## Usage

```
rdts(n, alpha, eta, tp = c(1, 1), tf = "poisson-tweedie", c = 1, zt = FALSE)
```

## Arguments

| | |
|---|---|
| `n` | Number of observations. |
| `alpha` | Index of stability; Number in (0,1) |
| `eta` | A parameter, eta>0. |
| `tp` | A vector of tempering parameters. |
| `tf` | Tempering function. It can be one of the "discrete-stable", "discrete-truncated-stable", "discrete-pRDTS", "poisson-tweedie", "exp-tempering", "beta-prime-tempering", "Pareto-tempering". |
| `c` | The essential supremum of the tempering function. |
| `zt` | Logical. If True it calculates zero-truncated probabilities. |

## Value

A vector of observations from a DTS distributions.

## References

M. Grabchak. Discrete tempered stable distributions. Methodology and Computing in Applied Probability, 24(3):1877-1890, 2021.

## Examples

```
n <- 10
rdts(n, 0.5, 1)
```

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