

Package ‘syt’

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Type Package

Title Standard Young Tableaux

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Description Deals with standard Young tableaux (field of combinatorics). Performs enumeration, counting, random generation, the Robinson-Schensted correspondence, and conversion to and from paths on the Young lattice.

License GPL-3

Encoding UTF-8

LazyData true

Imports Matrix, partitions, utils

Suggests testthat

URL <https://github.com/stla/syt>

BugReports <https://github.com/stla/syt/issues>

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NeedsCompilation no

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all_sytx	<i>Enumeration of standard Young tableaux</i>
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Description

Generates all standard Young tableaux of a given shape.

Usage

```
all_sytx(lambda)
```

Arguments

lambda shape, an integer partition

Value

A list of standard Young tableaux.

Examples

```
all_sytx(c(5,2))
```

ballot2syt	<i>Tableau as ballot sequence</i>
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Description

Converts a ballot sequence to its corresponding standard Young tableau.

Usage

```
ballot2syt(a)
```

Arguments

a ballot sequence

Value

A standard Young tableau.

See Also

[syt2ballot](#)

Examples

```
a <- c(1,1,2,3,2,1)
ballot2syt(a)
```

count_sytX	<i>Number of standard Young tableaux</i>
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Description

Number of standard Young tableaux of a given shape.

Usage

```
count_sytX(lambda)
```

Arguments

lambda an integer partition, the shape

Value

An integer, the number of standard Young tableaux of shape lambda.

See Also[all_syt](#)**Examples**

```
count_syt(c(5,4,1))
length(all_syt(c(5,4,1)))
```

dualsynt	<i>Dual tableau</i>
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Description

The dual standard Young tableau of a standard Young tableau.

Usage

```
dualsynt(syt)
```

Arguments

syt standard Young tableau

Value

A standard Young tableau.

Examples

```
syt <- list(c(1,2,6), c(3,5), 4)
dualsynt(syt)
```

firstsynt	<i>First tableau of a given shape</i>
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Description

Returns the "first" standard Young tableau of a given shape.

Usage

```
firstsynt(lambda)
```

Arguments

lambda the shape, an integer partition

Value

A standard Young tableau.

Examples

```
firstsyt(c(4,2,1))
```

gprocess2syt

Growth process to tableau

Description

Converts a growth process of integer partitions to its corresponding standard Young tableau.

Usage

```
gprocess2syt(path)
```

Arguments

path a path of the Young graph from the root vertex, given as a list of integer partitions

Value

A standard Young tableau.

See Also

[syt2gprocess](#)

Examples

```
path <- list(1, 2, c(2,1), c(3,1), c(3,1,1))
gprocess2syt(path)
```

hooklengths

Hook lengths

Description

Hook lengths of a given integer partition.

Usage

```
hooklengths(lambda)
```

Arguments

lambda an integer partition

Value

The hook lengths of the partition, given in a list.

See Also

[hooks](#)

Examples

```
hooklengths(c(4,2))
```

hooks

Hooks

Description

Hooks of a given integer partition.

Usage

```
hooks(lambda)
```

Arguments

lambda integer partition

Value

The hooks of the partition in a list.

See Also

[hooklengths](#)

Examples

```
hooks(c(4,2))
```

matrix2syt

Standard Young tableau from a matrix

Description

Converts a matrix to a standard Young tableau.

Usage

```
matrix2syt(M)
```

Arguments

M a matrix

Value

A standard Young tableau.

See Also

[syt2matrix](#)

Examples

```
M <- rbind(c(1,2,6), c(3,5,0), c(4,0,0))
matrix2syt(M)
```

nextsynt

Next tableau

Description

Given a standard Young tableau, returns the "next" one having the same shape.

Usage

```
nextsynt(syt)
```

Arguments

`synt` a standard Young tableau

Value

A standard Young tableau of the same shape as `synt`, or NULL if `synt` is the last standard Young tableau of this shape.

Examples

```
synt <- firstsynt(c(4,2,1))
nextsynt(synt)
```

rgprocess

Plancherel growth process

Description

Samples a path of the Young graph according to the Plancherel growth process.

Usage

```
rgprocess(n)
```

Arguments

`n` the size of the path to be sampled

Value

The path as a list, starting from the root vertex 1.

See Also

[gprocess2syt](#) and [syt2gprocess](#) to convert a Young path to a standard Young tableau and conversely.

Examples

```
rgprocess(7)
```

RS	<i>Robinson-Schensted correspondence</i>
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Description

Pair of standard Young tableaux given from a permutation by the Robinson-Schensted correspondence.

Usage

```
RS(sigma)
```

Arguments

`sigma` a permutation given as a vector of integers

Value

A list of two standard Young tableaux.

Examples

```
RS(c(1, 3, 6, 4, 7, 5, 2))
```

rsyt	<i>Random standard Young tableau</i>
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Description

Uniform sampling of a standard Young tableau of a given shape.

Usage

```
rsyt(lambda)
```

Arguments

`lambda` shape, an integer partition

Value

A standard Young tableau of shape lambda.

Examples

```
rsyt(c(7,3,1))
```

syt2ballot

Tableau as ballot sequence

Description

Converts a standard Young tableau to its corresponding ballot sequence.

Usage

```
syt2ballot(syt)
```

Arguments

syt standard Young tableau

Value

A ballot sequence.

See Also

[ballot2syt](#)

Examples

```
syt <- list(c(1,2,6), c(3,5), 4)
syt2ballot(syt)
```

syt2gprocess	<i>Tableau as growth process</i>
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Description

Converts a standard Young tableau to its corresponding growth process of partitions.

Usage

```
syt2gprocess(syt)
```

Arguments

syt standard Young tableau

Value

A list of integer partitions, representing a path of the Young graph starting from the root vertex.

See Also

[gprocess2syt](#)

Examples

```
syt <- list(c(1,2,4), 3, 5)
syt2gprocess(syt)
```

syt2matrix	<i>Standard Young tableau as sparse matrix</i>
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Description

Representation of a standard Young tableau as a sparse matrix.

Usage

```
syt2matrix(syt)
```

Arguments

syt a standard Young tableau

Value

A sparse matrix.

See Also[matrix2syt](#)**Examples**

```
syt <- list(c(1,2,6), c(3,5), 4)
syt2matrix(syt)
```

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