

# Package: RPPairwiseDesign (via r-universe)

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**Type** Package

**Title** Resolvable partially pairwise balanced design and Space-filling design via association scheme

**Version** 1.0

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**Description** Using some association schemes to obtain a new series of resolvable partially pairwise balanced designs (RPPBD) and space-filling designs.

**License** GPL-3

**NeedsCompilation** no

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**RemoteUrl** <https://github.com/cranhaven/cranhaven.r-universe.dev>

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**RemoteSubdir** RPPairwiseDesign

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RPPairwiseDesign-package

*Resolvable Partially Pairwise Balanced Design and Space-filling Design via Association Scheme.*

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## Description

In this package, we apply the (ASC-RPPBD) method on a series of association schemes to construct their associated RPPBD. Moreover, we apply the algorithm (ASC-SF) on the same series of association schemes to obtain their associated space filling design. Each design is identified by its configuration and its parameters.

## Details

Package: RPPairwiseDesign  
Type: Package  
Version: 1.0  
Date: 2014-12-10  
License: GPL-3

## Note

The Association schemes used in this R-package are :

Rectangular association scheme.

Group divisible association scheme.

Nested group divisible association scheme.

Right angular association scheme

Generalized rectangular right angular association scheme(4)

Generalized rectangular right angular association scheme(5)

Generalized rectangular right angular association scheme(7)

## Author(s)

Mohamed Laib, Imane Rezgui and Zebida Gheribi-Aoulmi

Maintainer: Mohamed Laib <laib.med@gmail.com>

## References

Imane Rezgui, Z.Gheribi-Aoulmi and Herve Monod. U-type Designs via New Generalized Partially Balanced Incomplete Block Designs with  $m = 4, 5$  and  $7$  Associated Classes. Applied Mathematics. to be appear.

Vartak M.N.1955. On an application of Kronecker product of Matrices to Statistical designs. Ann. Math. Stat.,26(420\_438).

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S. K. Tharthare, Right angular designs, Ann. Math. Statist. 36 (1963), 1057-1067.

Lokesh Dwivedi. Partially balanced Incomplete block designs. M.Sc. (Agricultural Statistics), Roll No. 4491, I.A.S.R.I., Library Avenue, New Delhi -110 012.

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 PPdiv

 Group divisible RPPBD
 

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## Description

The configuration of group divisible RPPBD obtained by applying the (ASC-RPPBD) method on a group divisible association scheme.

## Usage

PPdiv( $n, l$ )

## Arguments

|     |   |
|-----|---|
| $n$ | Number of lines of the association schemes.   |
| $l$ | Number of columns of the association schemes. |

## Value

A LIST :

|           |  |
|-----------|--|
| RPPBD     | The configuration of the RPPBD                                     |
| $v$       | Number of treatments   |
| $b$       | Number of blocs  |
| $r$       | The repetition of each treatments                                  |
| $k$       | A vector of the different bloc's size                              |
| $\lambda$ | A vector of the different values of $\lambda(i)$ ( $i=1,\dots,m$ ) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Imane Rezgui M.LAIB and Z.Gheribi-Aoulmi NEW SERIES OF RESOLVABLE PARTIALLY PAIRWISE BALANCED DESIGNS AND THEIR ASSOCIATED SPACE FILLING DESIGNS; accepted Proceeding on Afrika Statistika.

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Lokesh Dwivedi. Partially balanced Incomplete block designs. M.Sc. (Agricultural Statistics), Roll No. 4491, I.A.S.R.I., Library Avenue, New Delhi -110 012.

**Examples**

```
n<-3
l<-3
PPdiv(n,l)
```

---

PPGrectRightAng4

*Generalized rectangular right angular RPPBD (4).*

---

**Description**

The configuration of Generalized rectangular right angular RPPBD (4) obtained by applying the (ASC-RPPBD) method on a Generalized rectangular right angular association scheme (4).

**Usage**

```
PPGrectRightAng4(n, l, w)
```

**Arguments**

|   |  |
|---|--|
| n | Number of lines of the association schemes array   |
| l | Number of columns of the association schemes array |
| w | Number of the association scheme arrays            |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Imane Rezgui M.LAIB and Z.Gheribi-Aoulmi NEW SERIES OF RESOLVABLE PARTIALLY PAIRWISE BALANCED DESIGNS AND THEIR ASSOCIATED SPACE FILLING DESIGNS; accepted Proceeding on Afrika Statistika.

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**Examples**

```
n<-3
#The number of columns of the association scheme array need be bigger than 2
l<-3
w<-3
PPGrectRightAng4(n, l, w)
```

---

PPGrectRightAng5

*Generalized rectangular right angular RPPBD (5).*

---

**Description**

The configuration of Generalized rectangular right angular RPPBD (5) obtained by applying the (ASC-RPPBD) method on a Generalized rectangular right angular association scheme (5).

**Usage**

```
PPGrectRightAng5(n, l, w)
```

**Arguments**

|   |  |
|---|--|
| n | Number of lines of the association schemes array   |
| l | Number of columns of the association schemes array |
| w | Number of the association scheme arrays            |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Imane Rezgui M.LAIB and Z.Gheribi-Aoulmi NEW SERIES OF RESOLVABLE PARTIALLY PAIRWISE BALANCED DESIGNS AND THEIR ASSOCIATED SPACE FILLING DESIGNS; accepted Proceeding on Afrika Statistika.

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**Examples**

```
n<-3
#The number of columns of the association scheme array need be bigger than 2
l<-3
w<-3
PPGrectRightAng5(n, l, w)
```

---

PPGrectRightAng7

*Generalized rectangular right angular RPPBD (7).*

---

**Description**

The configuration of Generalized rectangular right angular RPPBD (7) obtained by applying the (ASC-RPPBD) method on a Generalized rectangular right angular association scheme (7).

**Usage**

```
PPGrectRightAng7(n, l, w)
```

**Arguments**

|   |  |
|---|--|
| n | Number of lines of the association schemes array   |
| l | Number of columns of the association schemes array |
| w | Number of the association scheme arrays            |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

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**Examples**

```
n<-3
#The number of columns of the association scheme array need be bigger than 2
l<-3
w<-3
PPGrectRightAng7(n, l, w)
```

PPNestdiv

*Nested group divisible RPPBD***Description**

The configuration of Nested group divisible RPPBD obtained by applying the (ASC-RPPBD) method on a nested group divisible association scheme.

**Usage**

PPNestdiv(n, l, w)

**Arguments**

|   |  |
|---|--|
| n | Number of lines of the association schemes array   |
| l | Number of columns of the association schemes array |
| w | Number of the association scheme arrays            |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Imane Rezgui M.LAIB and Z.Gheribi-Aoulmi NEW SERIES OF RESOLVABLE PARTIALLY PAIRWISE BALANCED DESIGNS AND THEIR ASSOCIATED SPACE FILLING DESIGNS; accepted Proceeding on Afrika Statistika.

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Lokesh Dwivedi. Partially balanced Incomplete block designs. M.Sc. (Agricultural Statistics), Roll No. 4491, I.A.S.R.I., Library Avenue, New Delhi -110 012.



**Examples**

```
n<-3
l<-3
w<-3
PPNestdiv(n, l, w)
```

---

 PPrect

*Rectangular RPPBD.*


---

**Description**

The configuration of rectangular RPPBD obtained by applying the (ASC-RPPBD) method on a rectangular association scheme.

**Usage**

```
PPrect(n, l)
```

**Arguments**

|   |  |
|---|--|
| n | Number of lines of the association schemes array   |
| l | Number of columns of the association schemes array |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Vartak M.N.1955. On an application of Kronecker product of Matrices to Statistical designs. Ann. Math. Stat.,26(420\_438).

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**Examples**

```
n<-3
l<-3
PPrect(n, l)
```

---

 PPrigntAng

*Right angular RPPBD*


---

**Description**

The configuration of right angular RPPBD obtained by applying the (ASC-RPPBD) method on a right angular association scheme.

**Usage**

```
PPrigntAng(n, l, w)
```

**Arguments**

|   |   |
|---|---|
| n | Number of lines of association schemes array.   |
| l | Number of columns of association schemes array. |
| w | Number of the association scheme arrays.        |

**Value**

A LIST :

|       |  |
|-------|--|
| RPPBD | The configuration of the RPPBD                           |
| v     | Number of treatments                                     |
| b     | Number of blocs  |
| r     | The repetition of each treatments                        |
| k     | A vector of the different bloc's size                    |
| lamda | A vector of the different values of lamda(i) (i=1,...,m) |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

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S. K. Tharthare, Right angular designs, Ann. Math. Statist. 36 (1963), 1057-1067.

**Examples**

```
n<-3
l<-3
w<-3
PPrightAng(n, l, w)
```

---

SpaceFilling

*Space-Filling design*


---

**Description**

The application of the (ASC-SF) algorithm on some association schemes to obtain new series of Space-filling Design.

**Usage**

```
SpaceFilling(asch)
```

**Arguments**

|      |  |
|------|--|
| asch | "character" contain the type of the association scheme used to obtain the Space Filling design, the association scheme used are :<br>"Div" : Group divisible association scheme.<br>"Rect" :Rectangular association scheme.<br>"Nestdiv" : Nested group divisible association scheme.<br>"RightAng" : Right angular association scheme.<br>"GrectRightAng4" : Generalized rectangular right angular association scheme(4).<br>"GrectRightAng5" : Generalized rectangular right angular association scheme(5).<br>"GrectRightAng7" : Generalized rectangular right angular association scheme(7). |
|------|--|

**Value**

A LIST :

|          |  |
|----------|--|
| SFDesign | The configuration of the Space Filling design. |
| Runs     | Number of runs in the Space-Filling design.    |
| Factors  | Number of factors.                             |
| Levels   | Levels of factors.                             |

**Author(s)**

Mohamed Laib, Imane Rezgui and Zoubida Gheribi-Aoulmi

**References**

Imane Rezgui and Z.Gheribi-Aoulmi New Series of Resolvable Partially Pairwise Balanced and Space Filling Designs via Association Schemes submitted.

**Examples**

```
#### Space Filling obtain via Group divisible association scheme.  
# SpaceFilling("PPdiv")
```

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