Package 'GRCdesigns'

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Type Package

Title Generalized Row-Column Designs

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Description When the number of treatments is large with limited experimental resources then Row-Column(RC) designs with multiple units per cell can be used. These designs are called Generalized Row-Column (GRC) designs and are defined as designs with v treatments in p rows and q columns such that the intersection of each row and column (cell) consists of k experimental units. For example (Bailey & Monod (2001)<doi:10.1111/1467-9469.00235>), to conduct an experiment for comparing 4 treatments using 4 plants with leaves at 2 different heights row-column design with two units per cell can be used. A GRC design is said to be structurally complete if corresponding to the intersection of each row and column, there appears at least two treatments. A GRC design is said to be structurally incomplete if corresponding to the intersection of any row and column, there is at least one cell which does not contain any treatment.

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.2.3

NeedsCompilation no

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Contents

SCGRC_I *Structurally Complete Generalized Row Column Designs of Series-I*

Description

This series generated through initial columns. The resulting GRC design is a row-column design with two units per cell and with p = t (>1) rows of size 2(2t+1), q = (2t+1) columns of size 2t, k = 2 and r = 2t replications.

Usage

```
SCGRC_I(v)
```

Arguments

v	Odd number(>3)

Value

This function generates structurally complete GRC designs for odd number of treatment as well as the information matrix for estimating elementary treatment contrast.

References

1) Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2014). Structurally incomplete row-column designs with multiple units per cell. Statistics and Applications, 12(1&2), 71-79.

2)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2015). Some series of row-column designs with multiple units per cell. Calcutta Statistical Association Bulletin, 67, (265-266), 89-99.

3)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2016). Series of incomplete row-column designs with two units per cell. Advances in Methodology and Statistics. 13(1), 17-25.

Examples

```
library(GRCdesigns)
SCGRC_I(5)
```

SCGRC_II *Structurally Complete Generalized Row Column Designs of Series-II*

Description

This series generated through initial columns. The parameters of the design are v, p = (v-1) rows of size v, q =v/2 columns of size 2(v-1), k = 2 and r = (v-1).

Usage

```
SCGRC_II(v)
```

Arguments

v	Even number(>3)

Value

This function generates structurally complete GRC designs for even number of treatment as well as the information matrix for estimating elementary treatment contrast.

References

1) Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2014). Structurally incomplete row-column designs with multiple units per cell. Statistics and Applications, 12(1&2), 71-79.

2)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2015). Some series of row-column designs with multiple units per cell. Calcutta Statistical Association Bulletin, 67, (265-266), 89-99.

3)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2016). Series of incomplete row-column designs with two units per cell. Advances in Methodology and Statistics. 13(1), 17-25.

Examples

```
library(GRCdesigns)
SCGRC_II(6)
```

SCGRC_III *Structurally Complete Generalized Row Column Designs of Series-III*

Description

The resulting design is a GRC designs with v (prime number) treatments in p = 2 rows, q = v(v-1) /2 columns and each cell of size k (2 <= k <= v-1).

Usage

```
SCGRC_III(v, k)
```

Arguments

v	Prime number(>3)
k	Number of units per cell

Value

This function generates structurally complete GRC designs for prime number of treatment as well as the information matrix for estimating elementary treatment contrast.

References

1) Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2014). Structurally incomplete row-column designs with multiple units per cell. Statistics and Applications, 12(1&2), 71-79.

2)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2015). Some series of row-column designs with multiple units per cell. Calcutta Statistical Association Bulletin, 67, (265-266), 89-99.

3)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2016). Series of incomplete row-column designs with two units per cell. Advances in Methodology and Statistics. 13(1), 17-25.

Examples

```
library(GRCdesigns)
SCGRC_III(7,2)
```

SIGRC_I *Structurally Incomplete Generalized Row Column Designs of Series-I*

Description

The parameter of the design are v (odd), p = (v-1) rows of size 2(v-1) each, q = v columns [one column of size 2(v-1) and remaining of size 2(v- 2) each], k = 2, r_1 (replication of first v-1 treatments) = 2v-3 and r_2 (replication of the v th treatment) = v-1.

Usage

```
SIGRC_I(v)
```

Arguments

v	Odd number(>3)

Value

This function generates structurally incomplete GRC designs for odd number of treatment with differential replication as well as the information matrix for estimating elementary treatment contrast.

References

1) Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2014). Structurally incomplete row-column designs with multiple units per cell. Statistics and Applications, 12(1&2), 71-79.

2)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2015). Some series of row-column designs with multiple units per cell. Calcutta Statistical Association Bulletin, 67, (265-266), 89-99.

3)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2016). Series of incomplete row-column designs with two units per cell. Advances in Methodology and Statistics. 13(1), 17-25.

Examples

```
library(GRCdesigns)
SIGRC_I(5)
```

`SIGRC_II` *Structurally Incomplete Generalized Row Column Designs of Series-II*

Description

This series generates using resolvable balanced incomplete block designs for a given v. The blocks are arranged in the row-column set up such that there should not be more than one blank cell in each row and column.

Usage

```
SIGRC_II(v)
```

Arguments

v	= s^2 where s is a prime number

Value

This function generates structurally incomplete GRC designs from resolvable (Balanced Incomplete Block) BIB designs as well as the information matrix for estimating elementary treatment contrast.

References

1) Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2014). Structurally incomplete row-column designs with multiple units per cell. Statistics and Applications, 12(1&2), 71-79.

2)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2015). Some series of row-column designs with multiple units per cell. Calcutta Statistical Association Bulletin, 67, (265-266), 89-99.

3)Datta, A., Jaggi, S., Varghese, C. and Varghese, E. (2016). Series of incomplete row-column designs with two units per cell. Advances in Methodology and Statistics. 13(1), 17-25.

Examples

```
library(GRCdesigns)
SIGRC_II(4)
```

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