

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](https://doi.org/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.

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Encoding UTF-8

RoxygenNote 7.2.3

NeedsCompilation no

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 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 ($2 \leq k \leq v-1$).

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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