Package 'TREDesigns'

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Type Package

Title Ternary Residual Effect Designs

Version 1.0.1

Maintainer Ashutosh Dalal <ashutosh.dalal97@gmail.com>

Description There are some experimental scenarios where each experimental unit receives a sequence of treatments across multiple periods, and treatment effects persist beyond the period of application. It focuses on the construction and calculation of the parametric value of the residual effect designs balanced for carryover effects, also referred to as crossover designs, change-over designs, or repeated measurements designs (Aggarwal and Jha, 2010<doi:10.1080/15598608.2010.10412013>). The primary objective of the package is to generate a new class of Balanced Ternary Residual Effect Designs (BTREDs), balanced for carryover effects tailored explicitly for situations where the number of periods is less than or equal to the number of treatments. In addition, the package provides four new classes of Partially Balanced Ternary Residual Effect Designs (PBTREDs), constructed using incomplete block designs, initial sequences, and rectangular association scheme. In addition, one extra function is included to help study the parametric properties of a given residual effect design.

Suggests MASS

License GPL (>= 2)

Encoding UTF-8

RoxygenNote 7.3.2

NeedsCompilation no

Author Akhilesh Jha [aut],
Cini Varghese [aut],
Seema Jaggi [aut],
Mohd Harun [aut],
Ashutosh Dalal [aut, cre]

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Contents

`BtRED` *Balanced Ternary Residual Effect Designs for Prime Number of Treatments*

Description

This function generates a class of balanced ternary residual effect designs (BTREDs) for a prime number of treatments (v), where (v >= 5) with p periods, determined as (v+3)/2, and n sequences, take the value v(v-1).

Usage

```
BtRED(v)
```

Arguments

v	Prime Number of Treatments, v (>= 5)

Value

It returns a new class of BTREDs along with its parameters, Information Matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects.

Examples

```
library(TREDesigns)
BtRED(v = 7)
```

PBtRED1 *Partially Balanced Ternary Residual Effect Designs for Prime Number of Treatments*

Description

This function generates a class of partially balanced ternary residual effect designs (PBTREDs) for a prime number of treatments (v), where (v >= 5) with p periods, take the value (v+3)/2, and n sequences, take the value v(v-1)/2.

Usage

```
PBtRED1(v)
```

Arguments

v	Prime Number of Treatments, v (>= 5)

Value

It returns a new class of PBTREDs along with its parameters, Information Matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects.

Examples

```
library(TREDesigns)
PBtRED1(v = 5)
```

PBtRED2 *Partially Balanced Ternary Residual Effect Designs for a Prime Number of Treatments, v (>=5); Series 1: v = 4m + 1, Series 2: v = 4m + 3 and Series 3: v = 6m + 1*

Description

This function generates three series of partially balanced ternary residual effect designs (PBTREDs) for a prime number of treatments (v), where (v >= 5) with p periods, and n sequences.

Parameters of Series 1: v = 4m+ 1, t = m, n = m(4m+ 1), p = 5, r = 5m

Parameters of Series 2: v = 4m+ 3, t = 2, n = 2(4m+ 3), p = 2(m+1), r = 4(m+1)

Parameters of Series 3: v = 6m+ 1, t = m, n = m(6m+1), p = 7, r =7m

Usage

```
PBtRED2(m, series)
```

Arguments

m	Any number (>= 1) such that v (>=5) is prime.
series	Choose series: 1, 2 or 3

Value

It returns the a new class of PBTREDs based on chosen m along with its parameters, Information matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects.

Examples

```
library(TREDesigns)
PBtRED2(m = 1, series=1)
```

PBtRED3 *Partially Balanced Ternary Residual Effect Designs for Number of Treatments, v (>= 5)*

Description

This function generates a new class of partially balanced ternary residual effect designs (PBTREDs) for all treatments, v (>= 5) in periods, p = (v+3)/2 if v is odd, otherwise p = (v+2)/2, and the number of sequences, n = 2v.

Usage

```
PBtRED3(v)
```

Arguments

v	Number of treatments (>= 5)

Value

It returns a new class of PBTREDs along with its parameters, Information matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects.

Examples

```
library(TREDesigns)
PBtRED3(v = 5)
```

PBtRED4 *Partially Balanced Ternary Residual Effect Designs for Number of Treatments, v = 2m (m >= 4 & even)*

Description

This function generates a new class of partially balanced ternary residual effect designs (PBTREDs) for the number of treatments, v = 2m; where m >= 4 & even. The number of periods, p = (v+4)/2, while the number of sequences, n = v.

Usage

```
PBtRED4(m)
```

Arguments

m	Any even number (>= 4)

Value

It returns a new class of PBTREDs along with its parameters, Information matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects.

Examples

```
library(TREDesigns)
PBtRED4(m = 4)
```

Study_RED *Studying Properties of Ternary Residual Effect Designs*

Description

To study the properties of any given ternary residual effect design.

Usage

```
Study_RED(design)
```

Arguments

design	Provide a ternary residual effect design

Value

It returns Information matrix (C), Average Variance Factor (AVF), and Canonical Efficiency Factor (CEF) for both treatment and residual effects for a given ternary residual design.

Examples

```
library(TREDesigns)
design=PBtRED3(v = 5)$PBTRED
Study_RED(design)
```

Index