Package 'PBtDesigns'

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Type Package

Title Partially Balanced t-Designs (PBtDesigns)

Version 1.0.0

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Description The t-designs represent a generalized class of balanced incomplete block designs in which the number of blocks in which any t-tuple of treatments (t >= 2) occur together is a constant. When the focus of an experiment lies in grading and selecting treatment subgroups, t-designs would be preferred over the conventional ones, as they have the additional advantage of t-tuple balance. t-designs can be advantageously used in identifying the best crop-livestock combination for a particular location in Integrated Farming Systems that will help in generating maximum profit. But as the number of components increases, the number of possible t-component combinations will also increase. Most often, combinations derived from specific components are only practically feasible, for example, in a specific locality, farmers may not be interested in keeping a pig or goat and hence combinations involving these may not be of any use in that locality. In such situations partially balanced t-designs with few selected combinations appearing in a constant number of blocks (while others not at all appearing) may be useful (Sayantani Karmakar, Cini Varghese, Seema Jaggi & Mohd Harun (2021)<doi:10.1080/03610918.2021.2008436>). Further, every location may not have the resources to form equally sized homogeneous blocks. Partially balanced t-designs with unequal block sizes (Damaraju Raghavarao & Bei Zhou (1998)<doi:10.1080/03610929808832657>. Sayantani Karmakar, Cini Varghese, Seema Jaggi & Mohd Harun (2022).`` Partially Balanced t-designs with unequal block sizes'') prove to be more suitable for such situations.This package generates three series of partially balanced t-designs namely Series 1, Series 2 and Series 3. Series 1 and Series 2 are designs having equal block sizes and with treatment structures 4(t + 1) and a prime number, respectively. Series 3 consists of designs with unequal block sizes and with treatment structure n(n-1)/2. This package is based on the function named PBtD() for generating partially balanced t-designs along with their parameters, information matrices, average variance factors and canonical efficiency factors.

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License GPL (>= 2)

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NeedsCompilation no

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Contents

`PBtD` *Partially Balanced t-Designs (PBtDesigns)*

Description

This package contains functions named PBtD() for generating partially balanced t-designs along with their parameters, information matrices, average variance factors and canonical efficiency factors.

Usage

```
PBtD(v, Series)
```

Arguments

`v`	Number of treatments
`Series`	Series of Partially Balanced t-Designs

Value

Three series are given for generating of partially balanced t-designs namely Series 1, Series 2 and Series 3.

Series 1 are designs having equal block sizes and with treatment structure 4(t + 1).

Series 2 are designs having equal block sizes and with treatment as a prime number.

Series 3 consists of designs with unequal block sizes and with treatment structure n(n-1)/2.

This function generates partially balanced t-designs along with their parameters, information matrices, average variance factors and canonical efficiency factors.

References

1) Karmakar, S., Varghese, C., Jaggi, S. & Harun, M. (2021)< DOI:10.1080/03610918.2021.2008436>. " Partially Balanced t-designs ".

2) Raghavarao, D. & Zhou, B. (1998)<https://doi.org/10.1080/03610929808832657> " Universal optimality of UE 3-designs for a competing effects model ".

3) Karmakar, S., Varghese, C., Jaggi, S. & Harun, M. (2022)." Partially Balanced t-designs with unequal block sizes ".

Examples

```
library(PBtDesigns)
PBtD(7,2)
```

Index