Package: rcd3 (via r-universe)

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Type Package

Title Efficient Row-Column Designs for 3 Level Factorial Experiments in 3 Rows

Version 0.1.1

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Description Provides functions to construct efficient row-column designs for 3-level factorial experiments in 3 rows. The designs ensure the estimation of all main effects (full efficiency) and two factor interactions in minimum replications. For more details, see Dey, A. and Mukerjee, R. (2012) <doi:10.1016/j.spl.2012.06.014> and Dash, S., Parsad, R., and Gupta, V. K. (2013) <doi:10.1007/s40003-013-0059-5>.

License GPL-3

Encoding UTF-8

RoxygenNote 7.3.2

Depends R (>= 3.6)

NeedsCompilation no

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Repository https://sukantaiasri.r-universe.dev

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rcd3 *Efficient Row-Column Designs for 3-Level Factorial Experiments in 3 Rows*

Description

Constructs efficient row-column designs for 3-level factorial experiments with 3 rows. The designs ensure the estimation of all main effects (full efficiency) and two-factor interactions in minimum replications.

Usage

```
rcd3(n_factors = 3, show_efficiency = TRUE, show_replications = TRUE, verbose = TRUE)
```

Arguments

`n_factors`	Number of factors in the experiment (integer >= 2). Each factor has 3 levels.
`show_efficiency`	Logical; if TRUE, prints efficiency factors for all main effects and two-factor interactions. Default is TRUE.
`show_replications`	Logical; if TRUE, prints full replications in row-column format preserving the original row/column labels. Default is TRUE.
`verbose`	Logical; if TRUE, displays progress messages and block tables using `message()`. Default is TRUE.

Details

Generates efficient row-column designs of 3-level factorial experiments in 3 rows, enabling estimation of all main effects (full efficiency) and two-factor interactions in minimum number of replications. Progress messages and principal block tables are displayed if `verbose = TRUE`.

Value

A list with the following components:

factors Vector of factor names.

normalized_effects Matrix of normalized main effects and two-factor interactions.

effect_labels Vector of effect labels corresponding to normalized effects.

chosen_principal_blocks List of selected principal blocks (matrices).

efficiency_factors Named vector of efficiency factors for all main effects and two-factor interactions (if show_efficiency = TRUE).

replications Nested list of full replications; final row-column design for a given number of factors.

Author(s)

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References

Dey, A., & Mukerjee, R. (2012). Some results on optimal block designs for 3-level factorial experiments. *Statistics & Probability Letters*, 82(6), 1202–1208. doi:10.1016/j.spl.2012.06.014

Dash, S., Parsad, R., & Gupta, V. K. (2013). Efficient block designs for 3-level factorial experiments. *J. Stat. Theory Pract.*, 7(3), 369–383. doi:10.1007/s4000301300595

See Also

`expand.grid`, `message`, `print`

Examples

```
rcd3(n_factors = 3, show_efficiency = TRUE, show_replications = TRUE, verbose = TRUE)
rcd3(n_factors = 2, show_efficiency = TRUE, show_replications = FALSE, verbose = TRUE)
quiet_result <- rcd3(n_factors = 4, verbose = FALSE)
result <- rcd3(n_factors = 4)
str(result$chosen_principal_blocks)
str(result$replications)
```

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∗ **design factorial block row-column efficiency**
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