Package 'bdf3'

September 14, 2025

Type Package

Title Efficient Block Designs for 3-Level Factorial Experiments in Block Size 3

Version 0.1.1

Description Provides functions to construct efficient block designs for 3-level factorial experiments in block size 3. The designs ensure the estimation of all main effects and two-factor interactions in minimum number of replications. For more details, see Dey and Mukerjee (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

Imports dplyr, stats

Depends R (>= 3.6)

NeedsCompilation no

Author Sunil Kumar Yadav [aut], Sukanta Dash [aut, cre]

Maintainer Sukanta Dash <sukanta.iasri@gmail.com>

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Contents

bdf3.mef *Efficient Block Designs for 3-Level Factorial Experiments in Block Size 3*

Description

Constructs efficient block designs for 3-level factorial experiments in block size 3, ensuring estimation of all main effects (with full efficiency) and two-factor interactions.

Usage

```
bdf3.mef(n_factors, show_efficiency = TRUE)
```

Arguments

n_factors	An integer specifying the number of factors.
show_efficiency	Logical. If TRUE, efficiency factors are computed and displayed; if FALSE, they are omitted.

Details

This function generates efficient block designs for 3-level factorial experiments in block size 3. The resulting designs allow estimation of all main effects (with full efficiency) and two-factor interactions in minimum number of replications.

Value

A list containing:

blocks	The chosen principal blocks
confounded_effects	The confounded main effects and two-factor interactions
efficiency_factors	Efficiency factors of all main effects and two-factor interactions (if show_efficiency = TRUE)
design	The final block design for the given number of factors

References

Dey, A. and Mukerjee, R. (2012). Efficiency factors for natural contrasts in partially confounded factorial designs. *Statistics and Probability Letters*, 82(12), 2180–2188. <doi:10.1016/j.spl.2012.06.014>

Dash, S., Parsad, R. and Gupta, V. K. (2013). Row–column designs for 2^n factorial 2-colour microarray experiments for estimation of main effects and two-factor interactions with orthogonal parameterization. *Agricultural Research*, 2(2), 172-182. <doi:10.1007/s40003-013-0059-5>

See Also

bdf3.mep

Examples

```
bdf3.mef(2)
```

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bdf3.mep *Efficient Block Designs for 3-Level Factorial Experiments in Block Size 3*

Description

Constructs efficient block designs for 3-level factorial experiments in block size 3, ensuring estimation of all main effects and two-factor interactions.

Usage

```
bdf3.mep(n_factors, show_efficiency = TRUE)
```

Arguments

n_factors	An integer specifying the number of factors.
show_efficiency	Logical. If TRUE, efficiency factors are computed and displayed; if FALSE, they are omitted.

Details

This function generates efficient block designs for 3-level factorial experiments in block size 3. The resulting designs allow estimation of all main effects and two-factor interactions in minimum number of replications.

Value

A list containing:

blocks	The chosen principal blocks
confounded_effects	The confounded main effects and two-factor interactions
efficiency_factors	Efficiency factors of all main effects and two-factor interactions (if show_efficiency = TRUE)
design	The final block design for the given number of factors

References

Dey, A. and Mukerjee, R. (2012). Efficiency factors for natural contrasts in partially confounded factorial designs. *Statistics and Probability Letters*, 82(12), 2180–2188. <doi:10.1016/j.spl.2012.06.014>

Dash, S., Parsad, R. and Gupta, V. K. (2013). Row–column designs for 2^n factorial 2-colour microarray experiments for estimation of main effects and two-factor interactions with orthogonal parameterization. *Agricultural Research*, 2(2), 172-182. <doi:10.1007/s40003-013-0059-5>

See Also

bdf3.mef

Examples

```
bdf3.mep(2)
```

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