Package: mixOofA (via r-universe)

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Title Design and Analysis of Order-of-Addition Mixture Experiments

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Depends R (>= 4.4.0)

Imports doofa, crossdes, mixexp, combinat, Rsolnp

Description A facility to generate various classes of fractional designs for order-of-addition experiments namely fractional order-of-additions orthogonal arrays, see Voelkel, Joseph G. (2019). ``The design of order-of-addition experiments." Journal of Quality Technology 51:3, 230-241, <doi:10.1080/00224065.2019.1569958>. Provides facility to construct component orthogonal arrays, see Jian-Feng Yang, Fasheng Sun and Hongquan Xu (2020). ``A Component Position Model, Analysis and Design for Order-of-Addition Experiments." Technometrics, <doi:10.1080/00401706.2020.1764394>. Supports generation of fractional designs for order-of-addition mixture experiments. Analysis of data from order-of-addition mixture experiments is also supported.

License GPL (>= 2)

Encoding UTF-8

NeedsCompilation no

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Repository https://doer0.r-universe.dev

RemoteUrl https://github.com/cran/mixOofA

RemoteRef HEAD

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Contents

`COA` *construct a component orthogonal array with m components when m is prime or prime power*

Description

construct a component orthogonal array with m components

Usage

```
COA(m)
```

Arguments

`m`	a positive integer, should be prime or prime power

Value

a component orthogonal array with m components

Examples

```
COA(5)
```

D_effi_pwo *D-efficiency from PWO matrix of a given design*

Description

Compute D-efficiency from PWO matrix of a given design for order-of-addition experiments

Usage

```
D_effi_pwo(X)
```

Arguments

X	PWO matrix of a design for order-of-addition experiments

Value

D-efficiency

Examples

```
design <- matrix(c(4,2,3,1,
4,1,3,2,
3,4,2,1,
3,4,1,2,
3,2,1,4,
3,1,2,4,
2,4,3,1,
2,4,1,3,
2,1,3,4,
1,4,3,2,
1,4,2,3,
1,2,3,4), 12, 4, byrow = TRUE)
X = PWO(design)
D_effi_pwo(X)
```

find_opt_target *Optimum mixture proportions and optimal order of addition of the components*

Description

Find optimum mixture proportions and optimal order of addition of the components

Usage

```
find_opt_target(m, model, target)
```

Arguments

m	number of mixture components
model	a fitted model of class lm which fits a model for data from mixture order-of-addition experiment
target	desired target value of response variable

Value

returns optimum mixture proportions of the components and their optimal order-of-addition

Examples

```
data(fish)
mixoofa.fit <- lm(y ~ -1 + (x1+x2+x3)^2 + z12+z13+z23, data = fish)
summary(mixoofa.fit)
find_opt_target(m = 3, mixoofa.fit, target = 2.75)
```

---

fish *Data from an mixture order-of-addition experiment*

Description

Data from an mixture order-of-addition experiment

Usage

```
data(fish)
```

Format

A data frame with 39 observations and following 7 variables.

- y response variable
- x1 first mixture component proportion
- x2 second mixture component proportion
- x3 third mixture component proportion
- z12 first PWO variable
- z13 second PWO variable
- z23 third PWO variable

Examples

```
data(fish)
```

mixoofa.anova *Anova Table for a mixture order-of-addition experiment*

Description

obtain ANOVA table for a mixture order-of-addition experiment

Usage

```
mixoofa.anova(formula, response, nmix, mixvar, Zmat, caption)
```

Arguments

formula	formula for mixture experiment
response	response variable
nmix	number of mixture components
mixvar	matrix representing mixture variables
Zmat	matrix containing PWO variables for the components
caption	caption for ANOVA table, default is blank

Value

an ANOVA table for mixture order-of-addition experiment

Examples

```
data(fish)
m = 3
mixvar<-fish[, 1:(m+1)]
Zmat<-fish[, (m+2): (m+1+choose(m,2))]
mixoofa.anova(y ~ -1 + (x1+x2+x3)^2, response=fish$y, nmix=m, mixvar, Zmat=Zmat,caption="")
```

oofa.oa *construct an order-of-addition orthogonal array with m+1 components from an order-of-addition orthogonal array with m components*

Description

construct an order-of-addition orthogonal array with m+1 components from an order-of-addition orthogonal array with m components

Usage

```
oofa.oa(design)
```

Arguments

design	an order-of-addition orthogonal array with m components

Value

a component orthogonal array with m+1 components

Examples

```
design <- matrix(c(4,2,3,1,
4,1,3,2,
3,4,2,1,
3,4,1,2,
3,2,1,4,
3,1,2,4,
2,4,3,1,
2,4,1,3,
2,1,3,4,
1,4,3,2,
1,4,2,3,
1,2,3,4), 12, 4, byrow = TRUE)
oofa.oa(design)
```

---

oofa.scd *Order-of-addition Simplex Centroid Designs*

Description

Construct an order-of-addition simplex centroid design with m components

Usage

```
oofa.scd(m)
```

Arguments

m	number of components

Value

An order-of-addition simplex centroid design

Examples

```
oofa.scd(4)
```

oofa.sld *Order-of-addition Simplex Lattice Designs*

Description

Construct an order-of-addition simplex lattice design with m components

Usage

```
oofa.sld(m)
```

Arguments

m	number of components

Value

An order-of-addition simplex lattice design

Examples

```
oofa.sld(4)
```

PWO *Pair-wise-ordering (PWO) matrix of a given design*

Description

Obtain PWO matrix from a given design for order-of-addition experiments

Usage

```
PWO(design)
```

Arguments

design	a design for order-of-addition experiments

Value

PWO matrix

Examples

```
design <- matrix(c(4,2,3,1,
4,1,3,2,
3,4,2,1,
3,4,1,2,
3,2,1,4,
3,1,2,4,
2,4,3,1,
2,4,1,3,
2,1,3,4,
1,4,3,2,
1,4,2,3,
1,2,3,4), 12, 4, byrow = TRUE)
PWO(design)
```

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