Package ‘FrF2.catlg128’

October 12, 2022

Title Catalogues of Resolution IV 128 Run 2-Level Fractional Factorials Up to 33 Factors that Do Have 5-Letter Words

Version 1.2-2

Depends R(>= 2.13.0), FrF2(>= 1.4)

Date 2022-02-23

Author Ulrike Groemping

Maintainer Ulrike Groemping <ulrike.groemping@bht-berlin.de>

Description Catalogues of resolution IV regular fractional factorial designs in 128 runs are provided for up to 33 2-level factors. The catalogues are complete, excluding resolution IV designs without 5-letter words, because these do not add value for a search for unblocked clear designs. The previous package version 1.0 with complete catalogues up to 24 runs (24 runs and a namespace added later) can be downloaded from the authors website.

License GPL (>= 2)

LazyLoad yes

Encoding latin1


NeedsCompilation no

Repository CRAN

Date/Publication 2022-02-24 11:00:18 UTC

R topics documented:

FrF2.catlg128-package .................................................. 2
Catalogues ................................................................. 3

Index 6
FrF2.catlg128-package

Catalogues of resolution IV 128 run 2-level fractional factorials up to 33 factors that do have 5-letter words

Description

Description: This package provides the complete catalogues of those resolution IV regular fractional factorial designs in 128 runs for up to 33 2-level factors that do have length 5 words (i.e. are not even). For 8 to 11 factors, the best design (resolution higher than IV, i.e. all two-factor interactions are clear) is included only.

Details

The complete set of designs on which these catalogues are based has been provided by Xu (2009) for up to 25 factors and by Mee (2012) for 26 to 33 factors. The designs provided in this package are useful for special tasks to be accomplished with package FrF2. The catalogues are separately provided here, because they are very large and should not be forced upon FrF2 users who do not need them.

The main reason for providing the catalogues is to support estimability requirements for clear two-factor interactions in package FrF2. According to Wu, Mee and Tang (2012), resolution IV designs with no 5-letter words do not add value (there is always a better design that can accommodate the same clear two-factor interactions). Therefore, starting with version 1.1, resolution IV designs without 5-letter words have been omitted from the catalogues, and the title of the package has been changed accordingly, from the previous "Complete catalogues of resolution IV 128 run 2-level fractional factorials up to 24 factors". The previously available complete catalogues of designs can be downloaded from the author’s website. Designs for 25 to 33 factors have been added with version 1.2 of the package.

Author(s)

Ulrike Groemping

Maintainer: Ulrike Groemping <ulrike.groemping@bht-berlin.de>

References


See Also

Catalogues
Catalogues of regular 128 run designs of various factor numbers

Description

Catalogues of regular 128 run designs of various factor numbers

Usage

catlg128.8to15
catlg128.16
catlg128.17
catlg128.18
catlg128.19
catlg128.20
catlg128.21
catlg128.22
catlg128.23
catlg128.24
catlg128.25
catlg128.26to33

Details

The files contain catalogues for regular fractional factorial designs in 128 runs; the numbers after the period indicate the number(s) of factors covered by the respective catalogue. All the catalogues are lists of class \texttt{catlg}. They are provided in support of package \texttt{FrF2}.

Originally, their main intention was to support automatic search of clear designs with options \texttt{estimable} and \texttt{clear=TRUE} in function \texttt{FrF2}. For this purpose, in principle, a complete catalogue of resolution IV designs in 128 runs would be needed. The catalogues come from Xu (2009; supplement on his website up to 25 factors) or Mee (2012, personal communication) and have been enriched by information on clear interactions (entry \texttt{clear.2fis} for each element).

Since version 2 of package \texttt{FrF2}, the catalogues can also support blocking of designs by the method proposed by Godolphin (2020), automated as described in Groemping (2021); with this method, blocking can (but need not) be combined with requiring specific 2fis to be clear. A few catalogue elements that are useful for that method have been added to the catalogue \texttt{catlg} in package \texttt{FrF2}.

For the search of clear designs, Wu, Mee and Tang (2012) proved that one need not consider designs with no 5-letter words, as they are always dominated by a better design that can clearly accommodate the same two-factor interactions. Therefore, as of version 1.1 of this package, the resolution IV designs in the catalogues have been reduced to those that do have 5-letter words. For the search for clear designs, it even suffices to search dominating designs only. These are identified by the dominating element of each catalogue entry. The previous complete catalogues of designs can be
Catalogues downloaded from the author’s website. Catalogues for 25 to 33 factors have been made available with version 1.2 of the package.

If one of these catalogues is used in the select.catlg option of function FrF2, the function is guaranteed to find the best clear design in 128 runs for the requested number of factors, when used with its option estimable.

For earlier versions of the package, the catalogues had to be loaded with a data() command. This is no longer required, and not even supported; the catalogues will now be automatically loaded on first use.

Author(s)
Ulrike Groemping

References

See Also
See Also FrF2, catlg

Examples

```r
catlg128.8to15[1:5]
```

```r
## example of using a catalogue from this package with function FrF2
## for keeping interactions clear
## the design in the example will also be found with the default catalogue
## because arrays for all compromise plans with up to 24 factors
## have been added to catlg with FrF2 version 1.1-1
plan <- FrF2(128, 23, estimable=compromise(23,1:2)$requirement, select.catlg=catlg128.23)
summary(plan)
length(catlg128.23)
```

```r
## example of using a catalogue from this package with function FrF2
## for blocking a design
requirement <- compromise(13,1)$requirement
## loop through designs from catlg
nn1 <- names(catlg128.8to15[nruns(catlg128.8to15)==128 & nfac(catlg128.8to15)==13])
for (nam in nn1){
  suppressMessages(
    des128fromcatlg <- try(
```
FrF2(design=nam, blocks=32, 
  factor.names=Letters[15:27], estimable=requirement, 
  alias.block.2fis = TRUE, select.catlg=catlg128.8to15), 
  silent=TRUE)

## stop at first success
if (!"try-error" %in% class(des128fromcatlg)) break

summary(des128fromcatlg)
Index

* array
  Catalogues, 3
  FrF2.catlg128-package, 2

* design
  Catalogues, 3
  FrF2.catlg128-package, 2

Catalogues, 2, 3
catlg, 3, 4
catlg128.16 (Catalogues), 3
catlg128.17 (Catalogues), 3
catlg128.18 (Catalogues), 3
catlg128.19 (Catalogues), 3
catlg128.20 (Catalogues), 3
catlg128.21 (Catalogues), 3
catlg128.22 (Catalogues), 3
catlg128.23 (Catalogues), 3
catlg128.24 (Catalogues), 3
catlg128.25 (Catalogues), 3
catlg128.26to33 (Catalogues), 3
catlg128.8to15 (Catalogues), 3

FrF2, 2–4
FrF2.catlg128 (FrF2.catlg128-package), 2
FrF2.catlg128-package, 2