Package ‘OptGS’

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Type Package
Title Near-Optimal and Balanced Group-Sequential Designs for Clinical Trials with Continuous Outcomes
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Maintainer James Wason <james.wason@mrc-bsu.cam.ac.uk>
Description Functions to find near-optimal multi-stage designs for continuous outcomes.
License GPL-2
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Author James Wason [aut, cre], John Burkardt [ctb]
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all.class Diferent generic functions for class OptGS

Description

Generic functions for summarising an object of class OptGS
optgs

Finding optimal and balanced group-sequential designs

Usage

## S3 method for class 'OptGS'
print(x, ...)
## S3 method for class 'OptGS'
plot(x, ylim= NULL, ...)

Arguments

x An output object of class OptGS
ylim y limits to be passed to plot
... Additional arguments to be passed.

Details

print.OptGS gives the group-size, stopping boundaries, and operating characteristics of the design
plot.OptGS produces a plot of the expected sample size as the standardised treatment effect differs

Value

Screen or graphics output.

Description

optgs is used to find a one-sided multi-stage design that balances four optimality criteria for a RCT
with normally distributed outcomes

Usage

optgs(delta0 = 0, delta1 = 1/3, J = 2, sigma = 1, sd.known = TRUE,
      alpha = 0.05, power = 0.9, weights = c(0.95, 0, 0, 0.05),
      initial = NULL)

Arguments

delta0 mean difference in treatment effect under the null hypothesis (default: 0)
delta1 clinically relevant difference used to power the trial (default: 1/3)
J number of stages in the trial (default: 2)
sigma assumed standard deviation of treatment responses (default: 1)
sd.known logical value indicating if sigma will be treated as known; if FALSE, a quantile
substitution method will be used to modify the stopping boundaries (default TRUE)
alpa one-sided type-I error rate required (default: 0.05)
powerfamily

powerfamily is used to find a one-sided extended power-family group-sequential design

Details

optgs uses the extended power-family of group-sequential tests, and searches for the values of the futility and efficacy shape parameters that optimise the specified weighting. A description of the extended power-family and optgs is provided in Wason (2012). The ‘weights’ argument corresponds to the weight put on: 1) the expected sample size at delta=delta0; 2) the expected sample size at delta=delta1; 3) the maximum expected sample size; 4) the maximum sample size (i.e. J*groupsize).

Value

groupsize the number of patients required per arm, per stage
futility the futility boundaries for the design
efficacy the efficacy boundaries for the design
ess the expected sample size at the delta0; the expected sample size at the delta1; and the maximum expected sample size
type1error the actual type-I error rate of the design
power the actual power of the design

References


Examples

```r
# Find a three-stage design that minimises the maximum expected sample size.
threestagedeltaminimax=optgs(J=3,weights=c(0,0,1,0))
plot(threestagedeltaminimax)
```

```r
power family    Finding extended power-family group-sequential designs
```
Usage

powerfamily(futility = 0L, efficacy = 0L, delta0 = 0L, delta1 = 1/3L,
J = 2L, sigma = 1L, sd.known = TRUEL, alpha = 0.05L, power = 0.9)

Arguments

  futility        shape parameter for futility boundaries (default: 0)
  efficacy        shape parameter for efficacy boundaries (default: 0)
  delta0          mean difference in treatment effect under the null hypothesis (default: 0)
  delta1          clinically relevant difference used to power the trial (default: 1/3)
  J               number of stages in the trial (default: 2)
  sigma           assumed standard deviation of treatment responses (default: 1)
  sd.known        logical value indicating if sigma will be treated as known; if FALSE, a quantile
                  substitution method will be used to modify the stopping boundaries (default
                  TRUE)
  alpha           one-sided type-I error rate required (default: 0.05)
  power           power required (default: 0.9)

Details

powerfamily uses the extended power-family of group-sequential tests. A description of the ex-
tended power-family is provided in Wason (2012).

Value

  groupsize       the number of patients required per arm, per stage
  futility        the futility boundaries for the design
  efficacy        the efficacy boundaries for the design
  ess             the expected sample size at the delta0; the expected sample size at the delta1;
                  and the maximum expected sample size
  typeIerror      the actual type-I error rate of the design
  power           the actual power of the design

References

Wason, J.M.S. OptGS: an R package for finding near-optimal group-sequential designs. Journal of

Examples

  # Find a three-stage design that has shape parameters -0.5 and 0.5.
  threestagedesign=powerfamily(J=3L,futility=-0.5L,efficacy=0.5)
  plot(threestagedesign)
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