Package ‘mded’

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Type Package
Title Measuring the Difference Between Two Empirical Distributions
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Description Provides a function for measuring the difference between two independent or non-independent empirical distributions and returning a significance level of the difference.
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mded-package Measuring the difference between two empirical distributions

Description

The package provides a function for measuring the difference between two independent or non-independent empirical distributions and returning a significance level of the difference.

Acknowledgments

I would like to thank Professor Gregory L. Poe for his kindness.
Note

Recommended citations:


Author(s)

Hideo Aizaki

References


mded

Measuring the difference between two empirical distributions

Description

The function measures the difference between two independent or non-independent empirical distributions and returns a significance level of the difference.

Usage

mded(distr1, distr2, detail = FALSE, independent = TRUE)

## S3 method for class 'mded'
print(x, digits = max(3, getOption("digits") - 3), ...)
Arguments

distr1 A vector of empirical distribution. distr1 is greater than distr2.
distr2 A vector of empirical distribution.
detail If TRUE, a vector of the difference between distr1 and distr2 is returned.
independent Set as FALSE when distr1 and distr2 are not independent of each other.
x An object of S3 class 'mded.'
digits A number of significant digits.
... Arguments passed to the function print.

Details

The function measures the difference between two independent or non-independent empirical distributions and returns a significance level of the difference on the basis of the methods proposed by Poe et al. (1997, 2005). Such calculations are frequently needed in empirical econometric studies wherein (marginal) willingness-to-pay distributions that are estimated using contingent valuation methods or discrete choice experiments have to be compared to each other.

Let us assume that X and Y are empirical distributions, which are depicted by the vector \( x = (x_1, x_2, ..., x_m) \), and \( y = (y_1, y_2, ..., y_n) \). The null hypothesis (H0) is \( X - Y = 0 \), while the alternative hypothesis (H1) is \( X - Y > 0 \). When X and Y are independent of each other, the complete combinatorial method (Poe et al. 2005) provides the one-sided significance level of H0 that is calculated by \( \frac{\#\{x_i - y_j \leq 0\}}{m \times n} \), where \( \#\{cond\} \) provides the number of times that cond is true. When X and Y are not independent of each other, the paird difference method (Poe et al. 1997) provides the one-sided significance level of H0 that is calculated by \( \frac{\#\{x_i - y_i \leq 0\}}{m} \), where m is equal to n.

Note that the function may take quite long, and would require large amount of memory to calculate the difference between two independent distributions if the argument detail is set as TRUE because the resulting difference is stored as a vector. For example, when distr1 and distr2 each contain 10,000 elements (observations), the vector of the difference contains 100,000,000 elements. If memory is lacking, R would stop running the function, showing an error message related to memory limitation.

Value

stat One-side significance level of the difference between distr1 and distr2.
means A vector of mean values of distr1 and distr2.
cases A vector of integer values describing a number of cases wherein the cond is true and that is false.
distr1 A vector assigned to distr1.
distr2 A vector assigned to distr2.
distr.names A vector of the names of objects assigned to distr1 and distr2.
diff A vector of the difference. If detail = TRUE, it is returned.

Author(s)

Hideo Aizaki
References


Examples

```r
set.seed(123)
x <- rnorm(100, 3)
y <- rnorm(100, 1)

out <- mded(distr1 = x, distr2 = y, detail = TRUE)
out
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