Package 'evilDice'

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Type Package

Title Test Dice Sets for Intransitive Properties

Version 1.0

Date 2023-03-08

Description
Checks to see whether a supplied set of dice (their face values) are transitive, returning pair-win and group-
roll win probabilities. Expected returns (mean magnitude of win/loss) are presented as well.

License LGPL-3

Imports graphics

NeedsCompilation no

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evilDice-package   *Test Dice Sets for Intransitive Properties*

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Details

    The DESCRIPTION file:

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Authors@R:	c(person(given = "Carl", family = "Witthoft", email = "cellocgw@gmail.com", role = c("aut", "cre")))
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Imports:	graphics
Author:	Carl Witthoft [aut, cre]
Maintainer:	Carl Witthoft <cellocgw@gmail.com>

Intransitive dice are dice which display the unintuitive property that every die has a winning probability against another die and a losing probability against another die in the set. This function tests the input set, returning the pairwise probabilities along with other interesting data.

Author(s)

NA Some fast algorithm code supplied by user "onyambu" at https://stackoverflow.com/questions/75463792/

Maintainer: NA

References

https://en.wikipedia.org/wiki/Intransitive_dice

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evilDice	*Function to Determine If a Set of Dice is Intransitive ~~*

Description

Intransitive dice sets are dice which display the unintuitive property that every die has a winning probability against a die and a losing probability against another die in the set. This function tests the input set, returning the pairwise probabilities along with the expected returns (mean magnitude of win/loss). In addition, the win probabilities for each die when the entire set is rolled as a group are provided.

Usage

```
evilDice(thevals)
```

Arguments

thevals   An N-row by M-column array, where each column contains the (numeric) values of the N faces of a given die. Note: if dice with unequal numbers of faces are desired, enter the NA value as needed to fill the array.

Details

Any tie (both dice show the same number) is treated as "not a win" and the value passed to the "expected return" calculation is zero. Since the win percentages are valid for any set of dice, this function can be used to determine the win rate for transitive dice.

Value

`thevals`	Echoes back the input array.
`pairs`	A 2-column array. The first column contains the win percentage of the pair identified in the row name. The second column contains the expected return, i.e. the mean magnitude of the wins. The upper rows present the "operational" pairing, i.e. D1 –> D2 –> D3 ... Dn –>D1 . Following that, all other possible pairings are given, e.g. D1 –> D3 , D2 –> D4
`groupwins`	The set of winnng probabilities for all dice when rolled as a group.
`diceType`	A brief message stating whether the input values represent intransitive dice or not.

Author(s)

Carl Witthoft Maintainer:Carl Witthoft carl@witthoft.com

Examples

```
triDice <- cbind(c(2,2,4,4,9,9), c(1,1,6,6,8,8), c(3,3,5,5,7,7))
(evilDice(triDice))

# Bradley Efron computed this set.
brad <- cbind(c(4, 4, 4, 4, 0, 0), c(3, 3, 3, 3, 3, 3), c(6, 6, 2, 2, 2, 2),c(5, 5, 5, 1, 1, 1))
(evilDice(brad))
```

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