Package ‘bride’

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Title Brier score decomposition of probabilistic forecasts for binary events
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Author Stefan Siegert
Maintainer Stefan Siegert <stefan_siegert@gmx.de>

Description Decomposes the empirical Brier score into reliability, resolution and uncertainty. Two different estimators for the components are provided: The original estimators proposed by Murphy (1974), and the bias-corrected estimators proposed by Ferro and Fricker (2012). Sampling variances of all the components are estimated. This package applies only to probabilistic predictions of binary events.

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Brier Score Decomposition

Description

Decomposes the empirical Brier score into reliability, resolution and uncertainty. Two different estimators for the components are provided: The original estimators proposed by Murphy (1974), and the bias-corrected estimators proposed by Ferro and Fricker (2012). Sampling variances of all the components are estimated. This package applies only to probabilistic predictions of binary events.
Usage

bride(p, y, n.bins=10, ...)

Arguments

- **p**: a vector of forecast probabilities. No default.
- **y**: a vector of binary event indicators. No default.
- **n.bins**: number of bins used for calculating the calibration function. Default n.bins = 10.
- **...**: possible additional arguments. Not used at the moment.

Details

The values of the forecast probabilities in p are binned into n.bins bins of equal length on the unit interval. All probabilities are replaced with their in-bin average. Based on this binning, the calibration function \( P(y = 1|p) \) is estimated, which is required to estimate the components of the Brier Score decomposition of p.

Value

An object of class bride, essentially a list containing:

- **p, y**: the objects of the original request.
- **n.bins**: number of equidistant, exhaustive bins used to calculate the cross table.
- **rel, res, unc**: reliability, resolution, uncertainty estimates derived by Murphy (1970).
- **rel2, res2, unc2**: bias-corrected reliability, resolution, uncertainty estimates derived by Ferro and Fricker (2012).
- **rel.var, res.var, unc.var, rel2.var, res2.var, unc2.var**: variance estimators derived by Siegert (2013).

Author(s)

Stefan Siegert

References

Murphy, AH (1974) *A new vector partition of the probability score*, Journal of Applied Meteorology, 12:595-600


Examples

```r
## number of forecasts and verifications
N <- 100
## produce some forecasts
p <- runif(n=N)
## produce events y[i] that occur with probability p[i]
y <- rbinom(n=N, size=1, prob=p)
## perform brier score decomposition
b <- bride(p=p, y=y)
## print
print(b)
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