Package 'attenuation'

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Type Package

Title Correcting for Attenuation Due to Measurement Error

Version 1.0.0

Description Confidence curves, confidence intervals and p-values for
correlation coefficients corrected for attenuation due to measurement error.
Implements the methods described in Moss (2019, <doi:10.48550/arXiv.1911.01576>).

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URL https://github.com/JonasMoss/attenuation/

BugReports https://github.com/JonasMoss/attenuation/issues

Encoding UTF-8

LazyData true

Suggests testthat, covr, spelling

RoxygenNote 6.1.1

Language en-US

NeedsCompilation no

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cc   *Confidence curves for attenuated correlation coefficients.*

Description

Confidence curves for attenuated correlation coefficients.

Usage

```
cc(r, N, lower = -1, upper = 1, by = 0.001, method = "corr",
  k = NULL)
```

Arguments

r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y.
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].
lower	Lower bound for the curve. Defaults to -1.
upper	Upper bound for the curve. Defaults to 1.
by	Increment of the sequence from lower to upper.
method	The type of confidence curve. Can be "corr", "cronbach", "HS" or "free". See the details of p_value.
k	Numeric vector of two positive integers. k[i] is the number of testlets for the for r[i+1]. Only needed for method "cronbach".

Value

An object of class ccaf.

Examples

```
r = c(0.20, sqrt(0.45), sqrt(0.55))
N = c(100, 100, 100)
plot(cc(r, N))
```

---

ci *Calculate a confidence interval for an attenuated correlation coefficient.*

Description

Calculate a confidence interval for an attenuated correlation coefficient.

Usage

```
ci(r, N, level = 0.95, method = "corr", k = NULL)
```

Arguments

r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y.
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].
level	Numeric in [0, 1]. Confidence level of the interval. Defaults to 0.95.
method	The type of confidence curve. Can be "corr", "cronbach", "HS" or "free". See the details of p_value.
k	Numeric vector of two positive integers. k[i] is the number of testlets for the for r[i+1]. Only needed for method "cronbach".

Value

Numeric in [0, 1]. The p-value under null-hypothesis rho.

Examples

```
r = c(0.20, sqrt(0.45), sqrt(0.55))
N = c(100, 100, 100)
ci(r, N) # Calculates 95% confidence set for rho.
```

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lines.ccaf *Add a plot a confidence curve of attenuated correlation coefficients.*

Description

Add a plot a confidence curve of attenuated correlation coefficients.

Usage

```
## S3 method for class 'ccaf'
lines(x, type = "l", col = "red3", lwd = 2, ...)
```

Arguments

x	An object of class `ccaf`. The confidence curve to plot.
type	The type of plot.
col	The color of the curve.
lwd	The thickness of the curve.
...	Passed to `lines`.

Value

An invisible copy of `x`.

`plot.ccaf`	*Plot a confidence curve of attenuated correlation coefficients.*

Description

Plot a confidence curve of attenuated correlation coefficients.

Usage

```
## S3 method for class 'ccaf'
plot(x, y, level = 0.95, ...)
```

Arguments

x	An object of class `ccaf`. The confidence curve to plot.
y	Ignored; supported for compatibility with the `plot` generic.
level	Level to highlight. Defaults to 0.95. If `NULL`, highlights no level.
...	Passed to `plot`.

Value

An invisible copy of `x`.

---

print.ccaf *Print method for* ccaf

Description

Print method for ccaf

Usage

```
## S3 method for class 'ccaf'
print(x, digits = 3, ...)
```

Arguments

x	Object of class ccaf.
digits	Passed to signif.
...	Ignored.

Value

Invisible copy of x.

---

p_value *Calculate the p-value for an attenuated correlation coefficient.*

Description

This function calculates four types of p-values for correlations coefficients corrected for attenuation, chosen in "method". The different p-values are described in Moss (2019). "corr" is the correlation based p-value, "cronbach" is the Cronbach alpha based p-value, "HS" is the Hunter-Schmidt p-value, while "free" is the correlation based p-value without positive constraints.

Usage

```
p_value(rho, r, N, method = "corr", k = NULL)
```

Arguments

rho	Numeric vector in [-1,1]. The correlation under the null hypothesis.
r	Numeric vector of three elements in [-1,1]. r[1] is the correlation between the noisy measures X' and Y', r[2] is the correlation between the noisy X' and the true X, while r[3] is the correlation between the noisy Y' and the true Y. They are the square root of the reliabilities. Must be positive method to "corr" and "cronbach".
N	Numeric vector of three positive integers. N[i] is the sample size for r[i].

method	The type of p-value. Can be "corr", "cronbach", "HS" or "free". See the details.
k	Numeric vector of two positive integers. k[i] is the number of testlets for the for r[i+1]. Only needed for method "cronbach".

Value

Numeric in [0, 1]. The p-value under the null-hypothesis that the true correlation is rho.

Examples

```
r = c(0.20, sqrt(0.45), sqrt(0.55))
N = c(100, 100, 100)
p_value(rho = 0, r, N) # Tests rho = 0.
```

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