

Package ‘BFF’

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Title Bayes Factor Functions

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Description Bayes factors represent the ratio of probabilities assigned to data by competing scientific hypotheses. Drawbacks of Bayes factors are their dependence on prior specifications that define null and alternative hypotheses and difficulties encountered in their computation. To address these problems we define Bayes factor functions (BFF) directly from common test statistics. BFFs depend on a single non-centrality parameter that can be expressed as a function of standardized effect sizes, and plots of BFFs versus effect size provide informative summaries of hypothesis tests that can be easily aggregated across studies. Such summaries eliminate the need for arbitrary bright-line thresholds to determine “statistical significance.” BFFs are available in closed form and can be computed easily from z , t , χ^2 , and F statistics.

License GPL (>= 2)

Encoding UTF-8

Imports BSDA, grDevices, graphics

Suggests testthat (>= 2.1.0), knitr, rmarkdown

RoxygenNote 7.1.1

VignetteBuilder knitr

Depends R (>= 2.10)

NeedsCompilation no

Repository CRAN

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BFF_chi2_test	<i>BFF_chi2_test</i>
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Description

Bayes Factor function test for the chi² statistic. Computes the Bayes factor in favor of the alternative given a chi² statistic, the degrees of freedom, and sample size. The plot shown when running the function is saved to "BFF_plot.pdf."

Usage

```
BFF_chi2_test(chi_stat, df, n, count = TRUE, savename = NULL)
```

Arguments

chi_stat	chi ² statistic
df	Degrees of freedom
n	Sample size
count	Is this a test of Pearson's chi ² test for goodness-of-fit? Default is TRUE. FALSE assumes a likelihood ratio test
savename	Name of pdf file to save. Requires .pdf extension. Required if saving plot

Value

Returns Bayes factor function results

BFF	Bayes Factor Function values
effect_size	Effect sizes tested (seq(0, 1, by = 0.01))
max_BFF	Maximum BFF value
max_RMSE	Effect size that maximizes BFF

Examples

```
BFF_chi2_test(chi_stat = 3.7, df = 10, n = 100)
```

BFF_F_test	<i>BFF_F_test</i>
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Description

Bayes Factor function test for the F statistic. Computes the Bayes factor in favor of the alternative given an F statistic, the degrees of freedom, and sample size. The plot shown when running the function is saved to "BFF_plot.pdf."

Usage

```
BFF_F_test(f_stat, df1, df2, n, savename = NULL)
```

Arguments

f_stat	F statistic
df1	Degrees of freedom
df2	Degrees of freedom
n	Sample size
savename	Name of pdf file to save. Requires .pdf extension. Required if saving plot

Value

Returns Bayes factor function results

BFF	Bayes Factor Function values
effect_size	Effect sizes tested (seq(0, 1, by = 0.01))
max_BFF	Maximum BFF value
max_RMSE	Effect size that maximizes BFF

Examples

```
BFF_F_test(f_stat = 4.6, df1 = 4, df2 = 10, n = 100)
```

BFF_t_test

*BFF_t_test***Description**

Bayes Factor function test for the t statistic. Computes the Bayes factor in favor of the alternative given a chi² statistic, the degrees of freedom, and sample size. The plot shown when running the function is saved to "BFF_plot.pdf."

Usage

```
BFF_t_test(
  t_stat,
  df,
  n = NULL,
  one_sample = TRUE,
  n1 = NULL,
  n2 = NULL,
  savename = NULL
)
```

Arguments

t_stat	t statistic
df	Degrees of freedom
n	Sample size
one_sample	Is this a one or two sample z-test? Default is FALSE
n1	Sample size of group 1 if one_sample is FALSE
n2	Sample size of group 2 if one_sample is FALSE
savename	Name of pdf file to save. Requires .pdf extension. Required if saving plot

Value

Returns Bayes factor function results

BFF	Bayes Factor Function values
effect_size	Effect sizes tested (seq(0, 1, by = 0.01))
max_BFF	Maximum BFF value
max_RMSE	Effect size that maximizes BFF

Examples

```
BFF_t_test(1.4, 10, n = 100)
```

BFF_z_test

BFF_z_test

Description

Bayes Factor function test for the t statistic. Computes the Bayes factor in favor of the alternative given a z statistic and sample size. The plot shown when running the function is saved to "BFF_plot.pdf."

Usage

```
BFF_z_test(  
  z_stat,  
  n = NULL,  
  one_sample = TRUE,  
  n1 = NULL,  
  n2 = NULL,  
  savename = NULL  
)
```

Arguments

<code>z_stat</code>	t statistic
<code>n</code>	Sample size
<code>one_sample</code>	Is this a one or two sample z-test? Default is FALSE
<code>n1</code>	Sample size of group 1 if <code>one_sample</code> is FALSE
<code>n2</code>	Sample size of group 2 if <code>one_sample</code> is FALSE
<code>savename</code>	Name of pdf file to save. Requires .pdf extension. Required if saving plot

Value

Returns Bayes factor function results

<code>BFF</code>	Bayes Factor Function values
<code>effect_size</code>	Effect sizes tested (seq(0, 1, by = 0.01))
<code>BFF_max_RMSE</code>	Maximum BFF value
<code>max_RMSE</code>	Effect size that maximizes BFF

Examples

```
BFF_z_test(1.4, 500)
```

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