

比率の検定

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1 目的

1 標本の場合の母比率の検定, 2 標本の場合の母比率の差の検定, 3 標本以上の場合の母比率の一様性の検定を行う。

2 使用法

```
import sys
sys.path.append("statlib")
from xtest import prop_test
prop_test(x, n=None, p=None, alternative="two_sided", conflevel=0.95,
          correct=True, verbose=True)}
```

2.1 引数

<code>x</code>	成功数のベクトル (1 標本の場合はスカラー), または, 成功数と失敗数の 2 列からなる行列。
<code>n</code>	試行回数のベクトル (1 標本の場合はスカラー)。 <code>x</code> が行列の場合には無視される。
<code>p</code>	成功する確率のベクトル。長さは <code>x</code> と同じであること。
<code>alternative</code>	対立仮説。デフォルトは "two_sided"。他に "less", "greater" を指定できる。3 標本以上の場合には "two_sided" 以外を指定しても無視される。
<code>conflevel</code>	信頼度。デフォルトは 0.95
<code>correct</code>	連続性の補正の有無 (デフォルトは True。3 標本以上の場合には無視される)
<code>verbose</code>	必要最小限のプリント出力をする。

2.2 戻り値の名前

"chisq"	検定統計量 (χ^2 分布にしたがう)
"df"	自由度
"pvalue"	p 値
"estimate"	標本比率
"nullvalue"	母比率
"confint"	信頼区間
"alternative"	対立仮説
"method"	検定手法名

3 使用例

3.1 1 標本の場合 (母比率の検定)

```
import sys
sys.path.append("statlib")
from xtest import prop_test

a = prop_test(3, 10)
```

```
1-sample proportions test with continuity correction
data: 3 out of 10, null probability = 0.5
chisq = 0.9, df = 1, p value = 0.34278
alternative hypothesis: true p is not equal to 0.5
95 percent confidence interval: [0.080948, 0.64633]
sample estimate = 0.3
```

```
a = prop_test(3, 10, alternative="less")
```

```
1-sample proportions test with continuity correction
data: 3 out of 10, null probability = 0.5
chisq = 0.9, df = 1, p value = 0.17139
alternative hypothesis: true p is less than 0.5
95 percent confidence interval: [0, 0.60435]
sample estimate = 0.3
```

```
a = prop_test(3, 10, alternative="greater")
```

```
1-sample proportions test with continuity correction
data: 3 out of 10, null probability = 0.5
chisq = 0.9, df = 1, p value = 0.82861
alternative hypothesis: true p is greater than 0.5
95 percent confidence interval: [0.096449, 1]
sample estimate = 0.3
```

```
a = prop_test(3, 10, correct=False)
```

```
1-sample proportions test without continuity correction
data: 3 out of 10, null probability = 0.5
chisq = 1.6, df = 1, p value = 0.20590
alternative hypothesis: true p is not equal to 0.5
95 percent confidence interval: [0.10779, 0.60322]
sample estimate = 0.3
```

```
a = prop_test(3, 10, alternative="less", correct=False)
```

```
1-sample proportions test without continuity correction
data: 3 out of 10, null probability = 0.5
chisq = 1.6, df = 1, p value = 0.10295
alternative hypothesis: true p is less than 0.5
```

95 percent confidence interval: [0, 0.5583]

sample estimate = 0.3

```
a = prop_test(3, 10, alternative="greater", correct=False)
```

1-sample proportions test without continuity correction

data: 3 out of 10, null probability = 0.5

chisq = 1.6, df = 1, p value = 0.89705

alternative hypothesis: true p is greater than 0.5

95 percent confidence interval: [0.12688, 1]

sample estimate = 0.3

```
a = prop_test(3, 10, p=0.4)
```

1-sample proportions test with continuity correction

data: 3 out of 10, null probability = 0.4

chisq = 0.10417, df = 1, p value = 0.74689

alternative hypothesis: true p is not equal to 0.4

95 percent confidence interval: [0.080948, 0.64633]

sample estimate = 0.3

Chi-squared approximation may be incorrect

3.2 2 標本の場合 (比率の差の検定)

```
a = prop_test([3, 6], [10, 15])
```

2-sample test for equality of proportions with continuity correction

data: [3 6] out of [10 15]

chisq = 0.0072338, df = 1, p value = 0.93222

alternative hypothesis: two_sided

95 percent confidence interval: [-0.56034, 0.36034]

sample estimates = 0.3, 0.4

Chi-squared approximation may be incorrect

```
a = prop_test([3, 6], [10, 15], correct=False)
```

2-sample test for equality of proportions without continuity correction

data: [3 6] out of [10 15]

chisq = 0.26042, df = 1, p value = 0.60983

alternative hypothesis: two_sided

95 percent confidence interval: [-0.47701, 0.27701]

sample estimates = 0.3, 0.4

Chi-squared approximation may be incorrect

```
a = prop_test([3, 6], [10, 15], p=[0.5, 0.4])
```

2-sample test for equality of proportions with continuity correction

data: [3 6] out of [10 15]

chisq = 0.96944, df = 2, p value = 0.61587

alternative hypothesis: two_sided

```
null values = 0.5, 0.4
sample estimates = 0.3, 0.4
```

```
a = prop_test([3, 6], [10, 15], alternative="less")
```

```
2-sample test for equality of proportions with continuity correction
data: [3 6] out of [10 15]
chisq = 0.0072338, df = 1, p value = 0.46611
alternative hypothesis: less
95 percent confidence interval: [-1, 0.29973]
sample estimates = 0.3, 0.4
Chi-squared approximation may be incorrect
```

3.3 3 標本以上の場合 (比率の一様性の検定)

「成功数」と「試行回数」の2つのベクトルで与える場合

```
a = prop_test([3, 4, 6], [10, 15, 23])
```

```
3-sample test for equality of proportions with continuity correction
data: [3 4 6] out of [10 15 23]
chisq = 0.055958, df = 2, p value = 0.97241
alternative hypothesis: two_sided
sample estimates = 0.3, 0.26667, 0.26087
Chi-squared approximation may be incorrect
```

「成功数」「失敗数」の2列を持つ行列で与える場合

```
a = prop_test([[3, 7], [4, 11], [6, 17]])
```

```
3-sample test for equality of proportions with continuity correction
data: [3 4 6] out of [10 15 23]
chisq = 0.055958, df = 2, p value = 0.97241
alternative hypothesis: two_sided
sample estimates = 0.3, 0.26667, 0.26087
Chi-squared approximation may be incorrect
```