

| Command | Explanation | Notes |
|---|---|---------------------------------------|
| <code>ss.norm.cdf(x)</code> | $\Pr(Z \leq x)$ | <code>import scipy.stats as ss</code> |
| <code>ss.t.cdf(x, n-1)</code> | $\Pr(T_{n-1} \leq x)$ | <code>import scipy.stats as ss</code> |
| <code>ss.chi2.cdf(x, n-1)</code> | $\Pr(\chi_{n-1}^2 \leq x)$ | <code>import scipy.stats as ss</code> |
| <code>ss.chi2.cdf(x, n-1)</code> | $\Pr(\chi_{n-1}^2 \leq x)$ | <code>import scipy.stats as ss</code> |
| <code>ss.f.cdf(x, v1, v2)</code> | $\Pr(F_{v_1, v_2} \leq x)$ | <code>import scipy.stats as ss</code> |
| <code>ss.norm.ppf(p)</code> | gives x s.t. $\Pr(Z \leq x) = p$ | <code>import scipy.stats as ss</code> |
| <code>ss.t.ppf(p, n-1)</code> | gives x s.t. $\Pr(T_{n-1} \leq x) = p$ | <code>import scipy.stats as ss</code> |
| <code>ss.chi2.ppf(p, n-1)</code> | gives x s.t. $\Pr(\chi_{n-1}^2 \leq x) = p$ | <code>import scipy.stats as ss</code> |
| <code>ss.f.ppf(p, v1, v2)</code> | gives x s.t. $\Pr(F_{v_1, v_2} \leq x) = p$ | <code>import scipy.stats as ss</code> |
| <code>ss.levene(x,y)</code> | Levene test for equal variances | <code>import scipy.stats as ss</code> |
| <code>ss.test_ind(x,y,equal_var)</code> | difference in means test | <code>import scipy.stats as ss</code> |

Distributions

Use cdf functions to find p -values and ppf functions to find critical values.

What is the probability of drawing a number from a T_{16} distribution that is less than or equal to 2? The command `ss.t.cdf(2, 16)` gives 0.9686.

Below what number does 90 percent of the T_{16} distribution fall below? The command `ss.t.ppf(0.90, 16)` gives 1.3368.

Difference in Means and Variances

I will import `https://www.wimivo.com/data.csv` into Python.

```
import pandas as pd
df = pd.read_csv(r'https://www.wimivo.com/data.csv')
```

I'll test for equality of variances after importing "scipy.stats" as `ss`.

```
import scipy.stats as ss
varTest = ss.levene(df["var1"], df["var2"])
print(varTest)
```

The p -value is 0.077, so I do not reject the null hypothesis of equal variances.

Having concluded that the two variances are equal, I'll do a difference in means test with `equal_var=True`.

```
ttest = ss.ttest_ind(df["var1"], df["var2"], equal_var=True)
print(ttest)
```

The p -value is 0.55, so I do not reject the null hypothesis of equal means.