MA541_part 7

August 8, 2021

[77]:
```
import numpy as np
import pandas as pd
```

[4]:
```
project_data = pd.read_csv('data.csv')
project_data.head()
```

[4]:

	Close_ETF	oil	gold	JPM
0	97.349998	0.039242	0.004668	0.032258
1	97.750000	0.001953	-0.001366	-0.002948
2	99.160004	-0.031514	-0.007937	0.025724
3	99.650002	0.034552	0.014621	0.011819
4	99.260002	0.013619	-0.011419	0.000855

[78]:
```
#Consider the entire Gold column as a random sample from the first population,
#and the entire Oil column as a random sample from the second population.␣
 ↪Assuming these two samples be
#drawn independently, form a hypothesis and test it to see if the Gold and Oil␣
 ↪have equal means in the
#significance level 0.05.
from scipy import stats
significance_level = 0.05
gold_update = project_data['gold'].tolist()
oil_update = project_data['oil'].tolist()
t_test, p_value= stats.ttest_ind(gold_update, oil_update)
print("The p_value is: ", p_value)
if p_value<significance_level:
    print("The test is failed to reject H0")
else:
    print("The test is reject H0")
```

```
The p_value is:  0.6274695292874639
The test is reject H0
```

[79]:
```
#Subtract the entire Gold column from the entire Oil column and generate a␣
 ↪sample of differences.
#Consider this sample as a random sample from the target population of␣
 ↪differences between Gold and Oil.
```

```
#Form a hypothesis and test it to see if the Gold and Oil have equal means in␣
 ↪the significance level 0.05.
from scipy import stats
gold_new_update = project_data['gold'].tolist()
oil_new_update = project_data['oil'].tolist()

difference_gold_oil = (project_data['gold'] - project_data['oil']).tolist()
#diff_gold_oil = difference_gold_oil.tolist()
#print(difference_gold_oil)

significance_level = 0.05

t_test, p_value= stats.ttest_ind(difference_gold_oil,gold_new_update)
print("The p_value of gold is: ", p_value)
if p_value>significance_level:
    print("The test is failed to reject H0")
else:
    print("The test is reject H0")

t_test, p_value= stats.ttest_ind(diff_gold_oil,oil_new_update)
print("The p_value of oil is: ", p_value)
if p_value>significance_level:
    print("The test is failed to reject H0")
else:
    print("The test is reject H0")
```

```
The p_value of gold is:  0.1791780857932626
The test is failed to reject H0
The p_value of oil is:  0.14206890398426383
The test is failed to reject H0
```

[82]:
```
#Consider the entire Gold column as a random sample from the first population,
#and the entire Oil column as a random sample from the second population.
#Assuming these two samples be drawn independently, form a hypothesis and
#test it to see if the Gold and Oil have equal standard deviations in the␣
 ↪significance level 0.05.

import scipy
significance_level = 0.05

f = np.var(project_data['gold']) / np.var(project_data['oil'])
n_oil = 50
n_gold = 50
result = 1-scipy.stats.f.cdf(f, n_oil - 1, n_gold -1)
print("The result is: ",result)

if p_value>significance_level:
```

```
    print("The test is failed to reject H0")
else:
    print("The test is reject H0")
```

```
The result is:  0.999987979230873
The test is failed to reject H0
```

[ ]: