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import numpy as np

import pandas as pd

X\_i = ["X1","X1","X1","X1","X1", "X2","X2","X2","X2", "X3","X3","X3","X3","X3","X3","X3","X4","X4","X4","X4"]

Values = [15, 13, 18, 16, 13, 16, 17, 19, 12, 20, 14, 15, 15, 18, 17, 14, 29, 31, 28, 27]

print(len(X\_i), len(Values))

Dict = {"X1": [15, 13, 18, 16, 13], "X2": [16, 17, 19, 12], "X3": [20, 14, 15, 15, 18, 17, 14], "X4" : [29, 31, 28, 27]}

df1 = pd.DataFrame({"XValues": X\_i, "Values": Values})

print (df1)

import statsmodels.api as sm

from statsmodels.formula.api import ols

lm = ols("Values~XValues", data=df1).fit()

anova = sm.stats.anova\_lm(lm, type=1)

anova

#residuals ssw

from statsmodels.stats.multicomp import pairwise\_tukeyhsd

tukey = pairwise\_tukeyhsd(df1["Values"], groups=df1["XValues"])

tukey.\_results\_table

from scipy import stats

print(stats.ttest\_ind(Dict["X1"], Dict["X4"], equal\_var=False, alternative="greater"))

print (stats.ttest\_ind(Dict["X1"], Dict["X2"], equal\_var=False, alternative="greater"))