my\_data <- mtcars

> **head**(my\_data, 6)

install.packages(“ggpubr”)

**library**("ggpubr")

ggscatter(my\_data, x = "mpg", y = "wt", add = "reg.line", conf.int = TRUE, cor.coef = TRUE, cor.method = "pearson", xlab = "Miles/(US) gallon", ylab = "Weight (1000 lbs)")

**Pearson correlation test**

Correlation test between mpg and wt variables:

res <- cor.test(my\_data$wt, my\_data$mpg,

method = "pearson")

res

## Spearman rank correlation coefficient

Spearman’s **rho** statistic is also used to estimate a rank-based measure of association. This test may be used if the data do not come from a bivariate normal distribution.

res2 <-cor.test(my\_data$wt, my\_data$mpg, method = "spearman")

res2

## Kendall rank correlation test

The **Kendall rank correlation coefficient** or **Kendall’s tau** statistic is used to estimate a rank-based measure of association. This test may be used if the data do not necessarily come from a bivariate normal distribution.

res2 <- cor.test(my\_data$wt, my\_data$mpg, method="kendall")

res2

**Pearson correlation test python**

**import math**

**def average(x):**

**assert len(x) > 0**

**return float(sum(x)) / len(x)**

**def pearson\_def(x, y):**

**assert len(x) == len(y)**

**n = len(x)**

**assert n > 0**

**avg\_x = average(x)**

**avg\_y = average(y)**

**diffprod = 0**

**xdiff2 = 0**

**ydiff2 = 0**

**for idx in range(n):**

**xdiff = x[idx] - avg\_x**

**ydiff = y[idx] - avg\_y**

**diffprod += xdiff \* ydiff**

**xdiff2 += xdiff \* xdiff**

**ydiff2 += ydiff \* ydiff**

**return diffprod / math.sqrt(xdiff2 \* ydiff2)**

**res=pearson\_def([1,2,3], [1,5,7])**

**print(res)**

from scipy.stats import pearsonr

x = [1, 2, 3, 4, 5]

corr = [2, 4, 6, 8, 10]

corr, p\_value = pearsonr(x, corr)

print(corr)

uncorr = [5, 6, 5, 6, 5]

corr, p\_value = pearsonr(x, uncorr)

print(corr)

## Spearman rank correlation coefficient

import scipy.stats as p

x = [5.05, 6.75, 3.21, 2.66]

y= [1.65, 26.5, -5.93, 7.96]

z = [1.65, 2.64, 2.64, 6.95]

print(p.spearmanr(x, y))

Kendall rank correlation test

--------------------------------------

import scipy.stats as p

x = [5.05, 6.75, 3.21, 2.66]

y= [1.65, 26.5, -5.93, 7.96]

z = [1.65, 2.64, 2.64, 6.95]

print(p.kendalltau(x, y))