Tutorial 10

Qn 1

In a previous tutorial, you compute the Pearson coefficient between stock 0005.HK and 0011.HK. The stock prices of the two stocks are modelled as random variables X and Y. Now let investigate whether the two stocks are related. Use

$$T = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

at $n-2$ d.f.

Compute the p-value. What can you conclude?

What underlying assumptions have you made implicitly?

Qn 2

Given the following data

x_i	y_i
1	2
2	4.5
3	5.5

a) Solve for the least square regression line $Y = A + Bx$. Show the detailed derivations.

b) Use the Excel's SLOPE and INTERCEPT function to compute A and B to verify the result.

c) Find Pearson coefficient r.

d) Use Excel's PEARSON function to verify the result.

e) Verify that $|r| = \sqrt{R^2}$, where R^2 is the coefficient of determination. What is the physical meaning of the coefficient of determination?

Qn 3

Using the data in the previous question, predict the value at $x = 4$ using the

a) least square regression line;

b) moving average method with a period of i) 2 and ii) 3;

c) exponential smoothing method with $\alpha = 0.7$.

Qn 4

Use Excel, generate 100 (x, Y) data in the form $Y = e^x$, where x is a random number between 1 and 100.

a) Compute the Pearson's coefficient.

b) Compute the Spearman's coefficient.

c) What do you observe?