LAB. METEOROLOGICAL DATA ANALYSIS ..... FOURTH STAGE

(The second Semester)

Department of Atmospheric Sciences

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Lecturers :

Dr. Farah haseeb , Dr. Khawla zaki , Dr. Taghreed ali , L. Luma mahdi ,

L.Zahraa arif , A.L. Zahraa abdul razzaq , A.L. Hala ali

Preparing by: Dr. Farah Haseeb, A.Pr. Ruaa mazin , L. Luma Mahdi

((The Second Lecture))

2-*Spearman's correlation(r)* :This parameter is used to find out the relationship between two or more variables (**non-linear relationship**) and is symbolized by (ρ).

is a statistical measure of rank correlation, It is the monotonic relationship between two variables (x, y) i.e. it depends on the location of the number (the number plus its value).The relationship is either direct, inverse, or perfect, and the correlation coefficient values are between (1 , -1).

0.01-0.19	**"very weak"**
0.20- 0.39	**"weak"**
0.40-0.59	**"moderate"**
0.60-0.79	**"strong"**
0 .80-1.0	**very strong**

- **Spearman's rank correlation between the two variables (x,y) is calculated using the following equation:**

$$\hat{\rho} = 1 - 6\frac{\sum_{i=1}^{n} d_i^2}{n(n^2 - 1)}$$

Where:

di = The difference between every two corresponding ranks.

di= xi – yi

n = Data number.

Example: For the following data, the estimates of a group of students in statistics and cloud physics, find the Spearman correlation.

Statistical meteoroloogy	Cloud physics	Xi (rank x)	Yi (rank y)	Di	Di^2
good	medium	3	4		
Weak	acceptable	6	5		
Very good	Excellent	2	1		
medium	good	4	3		
acceptable	Weak	5	6		
Excellent	Very good	1	2		

Example: For the following data, find the Spearman correlation.

X	Y	Xi (rank x)	Yi (rank y)	Di	Di^2
10	6				
5	5				
15	4				
25	3				
20	2				

H.W\\1- Prove that there is a relationship between evaporation and temperature, and mention the type of relationship.

T C^{O}	30	35	40	45	50
E mm	3	5	7	9	11

2- For the following data, the estimates of a group of students in physics and Math, find the Spearman correlation and Explain the type of relationship.

physics	Math
35	30
23	33
47	45
17	23
10	8
43	49
9	12
6	4
28	31