EoS - E-tutorial 02 - WiSe 2022/2023

StatRef.C.2.2.00021 (60 Punkte)

Sie haben die folgende Antwort gegeben:

The Economic and Social Statistics Department of Trier University conducts a survey among 100 master students who participated in the recent statistics exam. Among other things, the students were asked about the time they spent in preparation for the exam. The department wants to know whether there is a significant relation between the achieved number of points in the exam and the time the individual took for preparation. The following table contains information on seven participants randomly drawn.

Hint: Please round your results - if necessary and if not asked otherwise - to **four** decimal places.

Student	1	2	3	4	5	6	7
Preparation time in hours	49	110	45	159	32	78	70
Points achieved	146	190	170	202	132	210	104

a) (12 Points) Please calculate the empirical covariance between the variables $preparation\ time\ in\ hours$ and $achieved\ points$. 884.0816 ✓

b) (8 Points) Please calculate Pearson's correlation coefficient for the variables $preparation\ time\ in\ hours$ and $achieved\ points$. 0.5962 ✓

c) (10 Points) You already know that the achieved number of points is linearly dependent on the time spent preparing. Based on that knowledge, you estimate a linear regression model for all 100 students and get a value of $R^2 = 0.3301$ for the coefficient of determination. According to this, which of the following values is a plausible choice for Pearson's correlation coefficient in the whole sample? 0.5745 ✓

d) (30 Points) Finally, you want to calculate Spearman's rank correlation coefficient based on the data for all 100 students interviewed. You already know that: $\sum_{i=1}^{100} [Rk(x_i) - Rk(y_i)]^2$ = 66655. 0.6429 ✗

Die bestmögliche Lösung lautet:

The Economic and Social Statistics Department of Trier University conducts a survey among 100 master students who participated in the recent statistics exam. Among other things, the students were asked about the time they spent in preparation for the exam. The department wants to know whether there is a significant relation between the achieved number of points in the exam and the time the individual took for preparation. The following table contains information on seven participants randomly drawn.

Hint: Please round your results - if necessary and if not asked otherwise - to **four** decimal places.

Student	1	2	3	4	5	6	7

Preparation time in hours	49	110	45	159	32	78	70
Points achieved	146	190	170	202	132	210	104

a) (12 Points) Please calculate the empirical covariance between the variables $preparation\ time\ in\ hours$ and $achieved\ points$. 884.081632653061

b) (8 Points) Please calculate Pearson's correlation coefficient for the variables $preparation\ time\ in\ hours$ and $achieved\ points$. 0.596169653120041

c) (10 Points) You already know that the achieved number of points is linearly dependent on the time spent preparing. Based on that knowledge, you estimate a linear regression model for all 100 students and get a value of $R^2 = 0.3301$ for the coefficient of determination. According to this, which of the following values is a plausible choice for Pearson's correlation coefficient in the whole sample? 0.5745

d) (30 Points) Finally, you want to calculate Spearman's rank correlation coefficient based on the data for all 100 students interviewed. You already know that:
$\sum_{i=1}^{100} [Rk(x_i) - Rk(y_i)]^2$ = 66655. 0.6000300030003

Sie haben 30 von 60 möglichen Punkten erreicht.