EoS - E-tutorial 02 - WiSe 2022/2023

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StatRef.D.1.1.00019 (60 Punkte)

Sie haben die folgende Antwort gegeben:

During the annual Four Hills Tournament, four ski jumping competitions take place at different venues within a few days. At this year's competition in Innsbruck, the 30 best athletes of the first round reached the final and hence were allowed to attend the second round. The ski jumper who reaches the highest score after two rounds wins. This score consists of the total jumping distance (measured in metres) of both rounds as well as the wind conditions and the grade for the posture at both jumps. The following dataset contains information on the reached score as well as on the total jumping distance of 20 (out of a total of 30) jumpers in the final round. Download the dataset and load it into R.

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

Hint: You may find the R funtion **cor** and its different arguments quite useful.

Hint: The R funtion **lm** is a workhorse for linear regression analysis. Do not forget to check out the value section of the respective help file.

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il_qst_33404

il__qst_33404.RData (293 B)

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a) (8 points) Calculate the relation between the reached score and the total jumping distance by means of the rank correlation coefficient of Spearman. 0.8937 ✅

b) (10 points) You assume a linear relationship between the total jumping distance and the reached score (dependent variable). Hence, set up a suitable linear regression model and calculate the intercept by means of the method of ordinary least squares. -309.51 ✅

c) (6 points) Furthermore, determine the value of the coefficient of determination of your regression model. 0.7713 ✅

d) (4 points) Now assume that the total jumping distance should be measured in kilometres instead of metres. Which value does the coefficient of determination have after this transformation? .0007 ❌

e) (10 points) State the value of the sum of the squared residuals of your regression model. 0 ❌

f) (16 points) Assume that an athlete reaches a total jumping distance of 234.5 metres. Which score do you expect for this athlete, if you take your calculated regression model as a basis. 207.5585 ✅

g) (6 points) If the correlation coefficient of Bravais-Pearson takes on the value zero, this always implies that... ... there is no linear relationship between the variables. ✅

Die bestmögliche Lösung lautet:

During the annual Four Hills Tournament, four ski jumping competitions take place at different venues within a few days. At this year's competition in Innsbruck, the 30 best athletes of the first round reached the final and hence were allowed to attend the second round. The ski jumper who reaches the highest score after two rounds wins. This score consists of the total jumping distance (measured in metres) of both rounds as well as the wind conditions and the grade for the posture at both jumps. The following dataset contains information on the reached score as well as on the total jumping distance of 20 (out of a total of 30) jumpers in the final round. Download the dataset and load it into R.

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Hint: The R funtion **lm** is a workhorse for linear regression analysis. Do not forget to check out the value section of the respective help file.

> **il_qst_33404**
>
> il_qst_33404.RData (293 B)

a) (8 points) Calculate the relation between the reached score and the total jumping distance by means of the rank correlation coefficient of Spearman. 0.893747574075515

b) (10 points) You assume a linear relationship between the total jumping distance and the reached score (dependent variable). Hence, set up a suitable linear regression model and calculate the intercept by means of the method of ordinary least squares. -309.513470663118

c) (6 points) Furthermore, determine the value of the coefficient of determination of your regression model. 0.771307066872551

d) (4 points) Now assume that the total jumping distance should be measured in kilometres instead of metres. Which value does the coefficient of determination have after this transformation? 0.771307066872551

e) (10 points) State the value of the sum of the squared residuals of your regression model. 623.009862284459

f) (16 points) Assume that an athlete reaches a total jumping distance of 234.5 metres. Which score do you expect for this athlete, if you take your calculated regression model as a basis. 207.629452609652

g) (6 points) If the correlation coefficient of Bravais-Pearson takes on the value zero, this always implies that... ... there is no linear relationship between the variables.

Sie haben 46 von 60 möglichen Punkten erreicht.