EoS - E-tutorial 02 - WiSe 2022/2023

StatRef.D.1.1.00014 (60 Punkte)

Sie haben die folgende Antwort gegeben:

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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 Garmisch, 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_33399

il_qst_33399.RData (287 B)

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a) (8 points) Calculate the relation between the reached score and the total jumping distance by means of the correlation coefficient of Bravais-Pearson. 0.9736 ✅

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. -279.84 ✅

c) (6 points) Furthermore, determine the value of the coefficient of determination of your regression model. 0.9478 ✅

d) (4 points) State the value of the sum of all residuals of your regression model. 0 ✅

e) (10 points) State the value of the sum of the squared residuals of your regression model. 185.4861 ✅

f) (16 points) Assume that an athlete reaches a total jumping distance of 250.5 metres. Which score do you expect for this athlete, if you take your calculated regression model as a basis. 230.9731 ✅

g) (6 points) How does the value of the coefficient of determination change if the jumping distance is measured in inch instead of metres? Hint: 1 metre = 39.37 inches. The new coefficient of determination equals 39.37 times the previous coefficient of determination. ❌

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 Garmisch, 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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> **il_qst_33399**
>
> il_qst_33399.RData (287 B)

a) (8 points) Calculate the relation between the reached score and the total jumping distance by means of the correlation coefficient of Bravais-Pearson. 0.973566314925645

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. -279.846486519835

c) (6 points) Furthermore, determine the value of the coefficient of determination of your regression model. 0.947831369557901

d) (4 points) State the value of the sum of all residuals of your regression model. 0

e) (10 points) State the value of the sum of the squared residuals of your regression model. 185.486061138873

f) (16 points) Assume that an athlete reaches a total jumping distance of 250.5 metres. Which score do you expect for this athlete, if you take your calculated regression model as a basis. 230.965497563082

g) (6 points) How does the value of the coefficient of determination change if the jumping distance is measured in inch instead

of metres? Hint: 1 metre = 39.37 inches. The coefficient of determination remains unchanged.

Sie haben 54 von 60 möglichen Punkten erreicht.