Kungliga Tekniska Högskolan

SF2930 Regression Analysis

Report I

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3.1   Residual analysis

3.1.1   Normality of residuals

Figure 1 illustrates QQ plot of the model residuals. The observer may say that the points exhibit a pattern that indicates that the residuals come from a distribution with heavier tails than that of a normal distribution. [1]. Still, the deviations from the diagonal line is relatively small, and hence we conclude that the first Gauss-Markov condition is fulfilled.
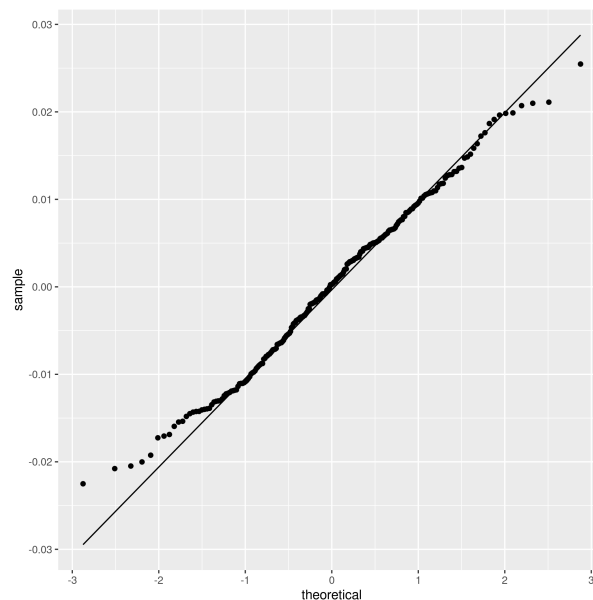

Figure 1:   Normality plot of residuals.

3.1.2 Fitted Against Residuals

Figure 2 illustrates the fitted values $\hat{y}_j$ against the R-student residuals. No apparent pattern is detected in the figure, i.e. the points seem to be randomly scattered along the horizontal line. Hence, we conclude that the second Gauss-Markov condition is fulfilled.
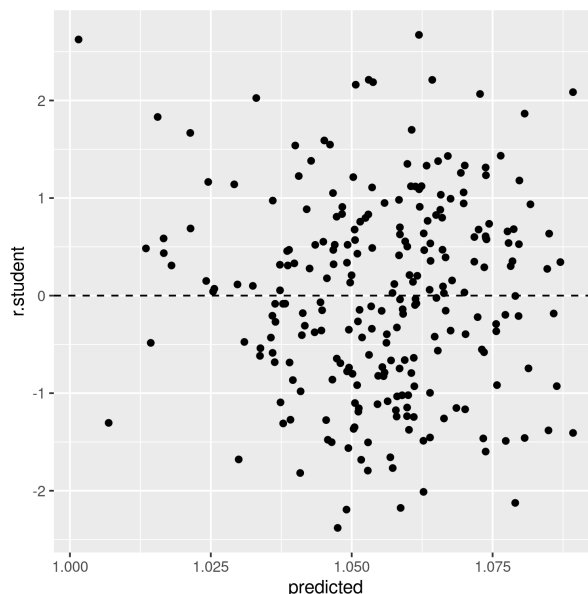

Figure 2: Fitted values against R-student residuals.

3.1.3 Added Variable Analysis

Partial regression plots are found in figure 3, 4, 5, and 6. All figures exhibits potential outliers (which will be further considered in section 2.2). More specifically, in figure 3 we note a few potential outliers on the right hand side of the plot for the `biceps` regressor, and on the right and left hand side for the `forearm` regressor. Moreover, in figure 4, we notice outliers on the right hand side of the `ankle` plot, and a group of potential outliers on the `thigh` plot. Finally, we notice a few potential outliers in figure 5 and 6.

Figure 4, 5, and 6 conveys important information about the information that `knee`, `height`, and `chest` adds to the model. These regressors seem to follow a horizontal band along a fitted line from the origin, which may suggest that none of the regressors adds additional information to the predictions.
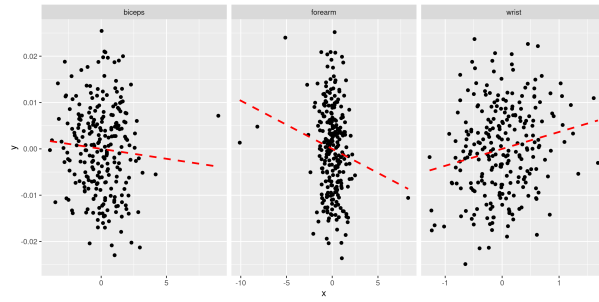
Figure 3: Partial regression plots of regressors `biceps`, `forearm`, and `wrist`.
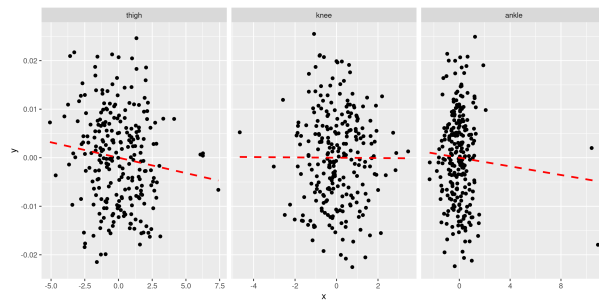

Figure 4: Partial regression plots of regressors `thigh`, `knee`, and `ankle`.
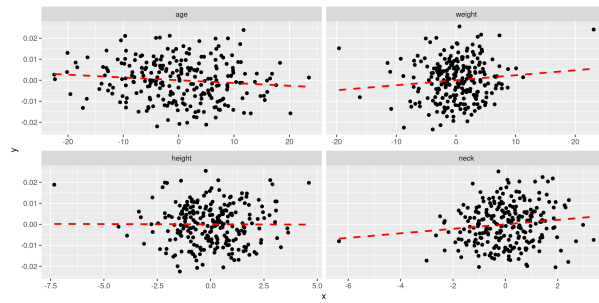

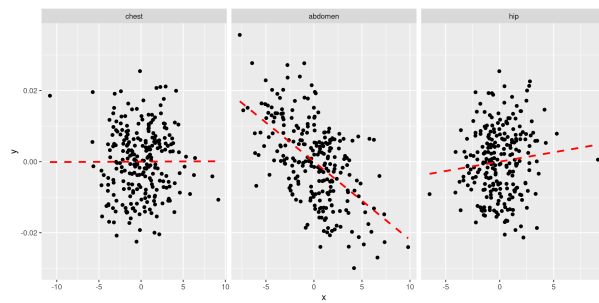Figure 5: Partial regression plots of regressors `age`, `weight`, `height`, and `neck`.

Figure 6: Partial regression plots of regressors `chest`, `abdomen`, and `hip`.

3.2 Diagnostics and handling of Outliers

3.3 Transformations of variables

4 Conclusion

References

[1] Douglas C Montgomery, Elizabeth A Peck, and G Geoffrey Vining. *Introduction to Linear Regression Analysis*. Wiley-Interscience, 5 edition, 2012.