Lab3

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Topics

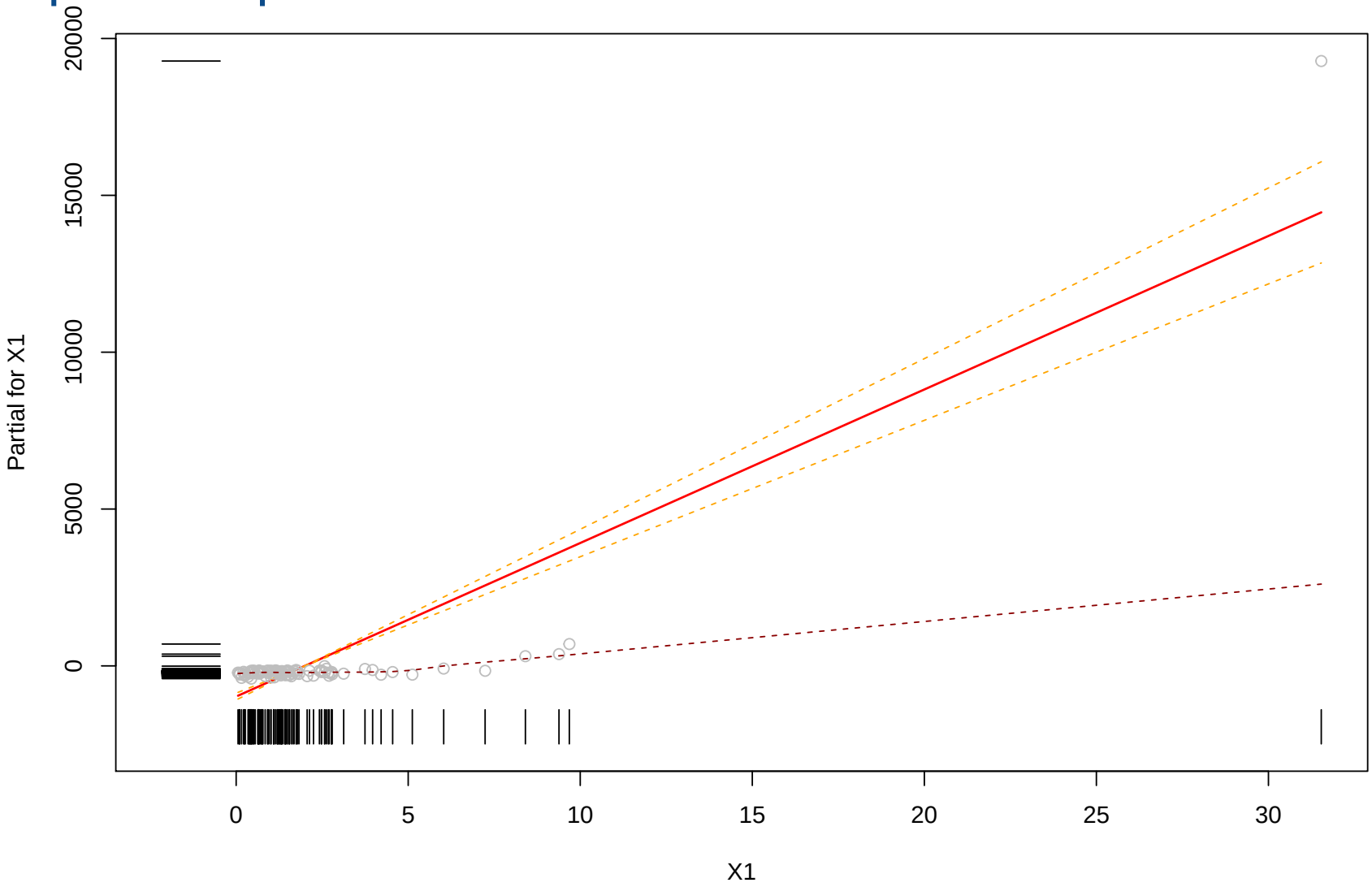
- wercker
- termplot
- residuals in GLMS
- more on interactions

wercker

- Check your builds

Termplot Example

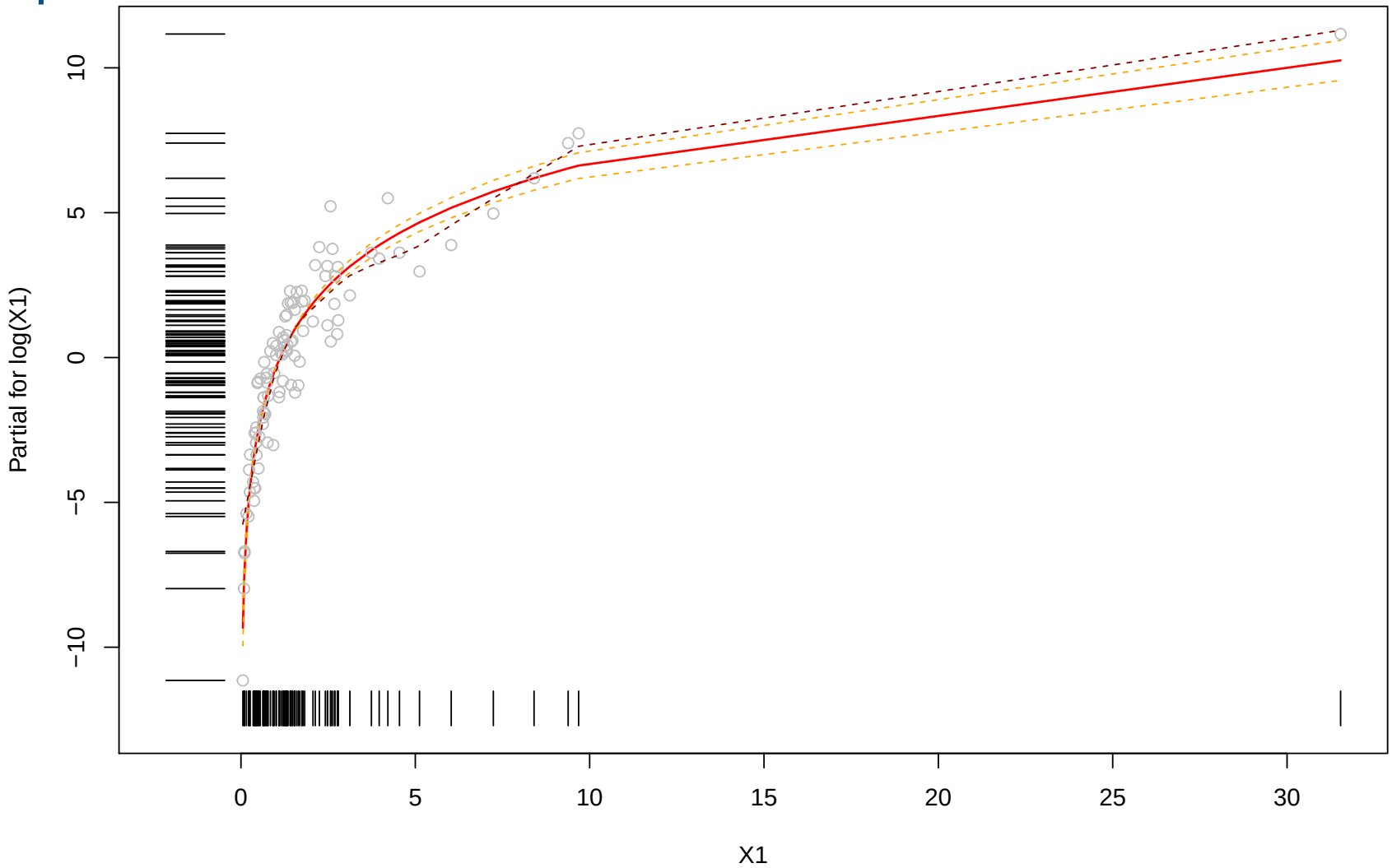
Termplot output



##

Termplot output

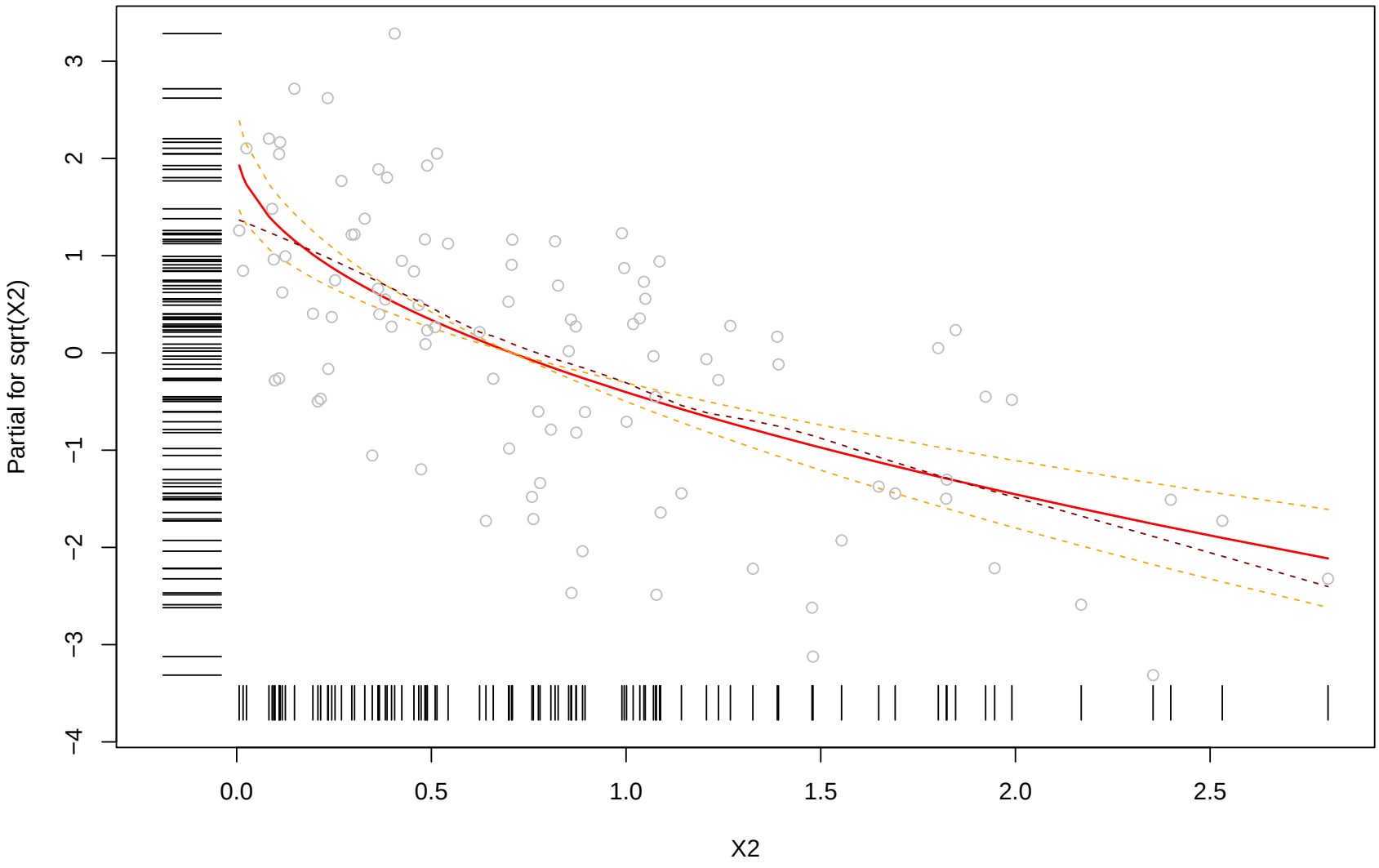
termplot with transformation of Y and X1



##

termplot with transformation of Y and X1

termplot with transformation of Y, X1, and X2



What is in a term plot?

- x-axis is the (untransformed) variable in your dataframe $(X1, X2)$
- line is the "term" of that variable's contribution to $f(x)$
- y-axis is partial residuals for term
- `partial.resid = T` adds the partial residuals to the plot
- `rug = T` shows location of data on axes
- `se = T` adds the SE of the term's contribution to $f(x)$
- `smooth = panel.smooth` adds "smoothed" means to plot

Terms

$$Y = \hat{\beta}_0 + \hat{\beta}_1 X1 + \hat{\beta}_2 X2 + e$$

Equivalent to centered model

$$Y = \bar{Y} + \hat{\beta}_1 (X1 - \bar{X1}) + \hat{\beta}_2 (X2 - \bar{X2}) + e$$

Terms are coefficient estimates times centered predictors

$$\hat{\beta}_1 (X1 - \bar{X1})$$

$$\hat{\beta}_2 (X2 - \bar{X2})$$

Terms with transformations

$$\log(Y) = \hat{\beta}_0 + \hat{\beta}_1 \log(X1) + \hat{\beta}_2 X2 + e$$

Equivalent to centered model

$$\log(Y) = \log(\bar{Y}) + \hat{\beta}_1(\log(X1) - \log(\bar{X1})) + \hat{\beta}_2(X2 - \bar{X2}) + e$$

Terms are coefficient estimates times centered "predictors"

$$\hat{\beta}_1(\log(X1) - \log(\bar{X1}))$$

partial residuals for a term

$$\log(Y) = \log(\bar{Y}) + \hat{\beta}_1(\log(X1) - \log(\bar{X1})) + \hat{\beta}_2(X2 - \bar{X2}) + e$$

$$\log(Y) - (\log(\bar{Y}) + \hat{\beta}_1(\log(X1) - \log(\bar{X1}))) = \hat{\beta}_2(X2 - \bar{X2}) + e$$

- Lefthand side takes response and removes the part of the response that is explained by $X1$
- Equal to the `term` for $X2$ plus the residual e
- part of residual variation that is not explained by the other terms that potentially can be explained by $X2$ = partial residual for $X2$
- partial residual for X1

$$\hat{\beta}_1(\log(X1) - \log(\bar{X1})) + e$$