Take home 2

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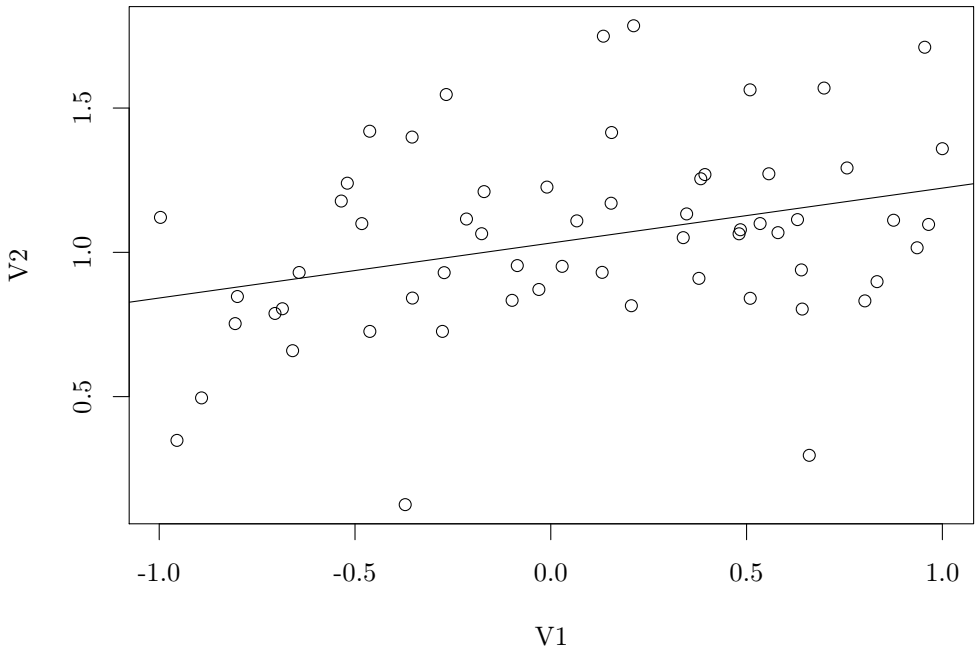
Question 1

(a)

The value for the intercept of the fit is 1.0321764 and for the rico of the fit is 0.1904323



Figuur 1: line fit throught the data in Ex1.txt

(b)

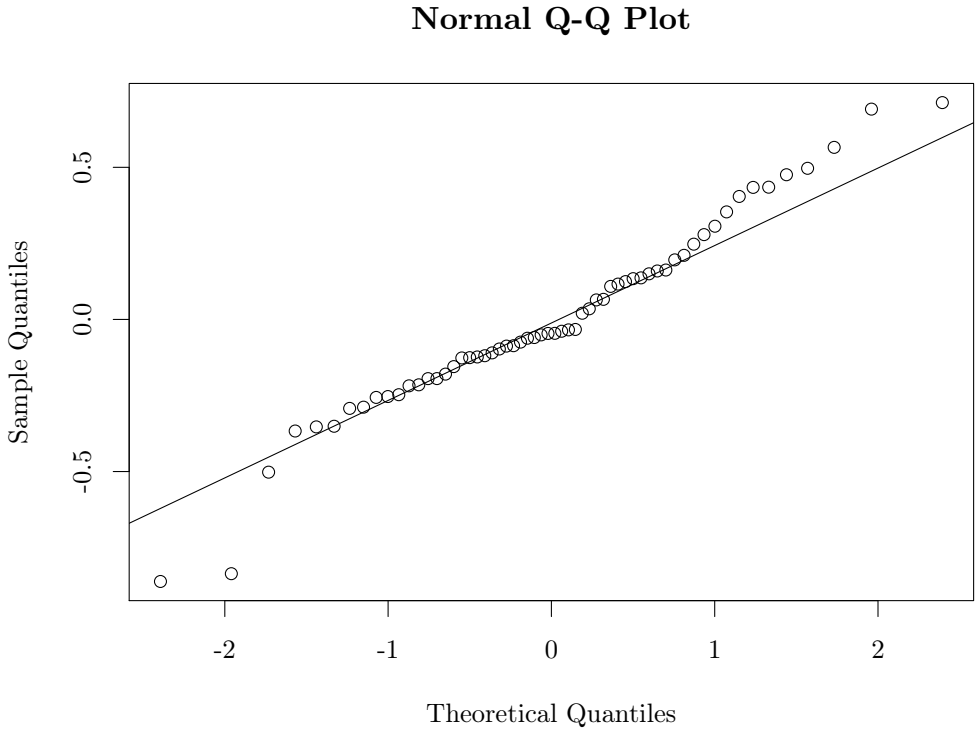
Using the result from section 7.4.1 in <REFERENCE cursus> we know that the random variable

$$T = \frac{\beta_1}{\sqrt{\frac{S^2}{\sum_{i=1}^{n}(x_i - \bar{x}^2)}}} \tag{1}$$

has a Student distribution with $n-2$ degrees of freedom. The test value is 2.603. Using a student-t distribution with $60-2=58$ degrees of freedom we find a p-value of 0.0117. At the confidence level $\alpha = 0.01$, the null hypothesis that $\beta_1 = 0$ holds. The 99% confidence region for the test value is $[-2.663, 2.663]$.

(c)

A q-q plot is a plot where the quantiles of the assumed distribution are plotted against the quantiles from the sample. So in a sample of n points where we label the observation $x_i, i \in \{1, 2, \ldots, n\}$ from lowest to highest, the ith point will be plotted at the $(Q(i/n), x_i)$. Here $Q(x)$ is the quantile function of the assumed distribution. This is a function such that $P(X < Q(p)) = p$. If the assumed distribution is a good model for the observed sample, the points will well fitted by a linear function.



Figuur 2: qq plot for the errors on the fit