

Homework 4 Solution :: MATH 504

Your homework submission must be a single pdf called “LASTNAME-hw1.pdf” with your solutions to all theory problem to receive full credit. All answers must be typed in Latex.

1. Download the datafile `economic_data.txt`. See the datafile for details regarding the column values and meaning, note that the datafile has six covariates (A_1, A_2, \dots, A_6). Consider the multiple linear model, and find the best fit for this model

Solution.

```
library(dplyr)

economic_data <- read.csv("~/desktop/economic_data.txt",
  sep = ",", header = T)

lmeconomic_data <- lm(Y~A1+A2+A3+A4+A5+A6, data = economic_data) #Create the linear regression
summary(lmeconomic_data) #Review the results
```

Index	A1	A2	A3	A4	A5	A6	Y
1	83.0	234289	2356	1590	107608	1947	60323
2	88.5	259426	2326	1456	108632	1948	61122
3	88.2	258054	3682	1616	109773	1949	60171
4	89.5	284599	3351	1650	110929	1950	61187
5	96.2	328975	2099	3099	112075	1951	63221
6	98.1	346999	1932	3594	113270	1952	63639
7	99.0	365385	1870	3547	115094	1953	64989
8	100.0	363112	3578	3350	116219	1954	63761
9	101.2	397469	2904	3048	117388	1955	66019
10	104.6	419180	2822	2857	118734	1956	67857
11	108.4	442769	2936	2798	120445	1957	68169
12	110.8	444546	4681	2637	121950	1958	66513
13	112.6	482704	3813	2552	123366	1959	68655
14	114.2	502601	3931	2514	125368	1960	69564
15	115.7	518173	4806	2572	127852	1961	69331
16	116.9	554894	4007	2827	130081	1962	70561

```
Call:
lm(formula = Y ~ A1 + A2 + A3 + A4 + A5 + A6, data = economic_data)
```

```
Residuals:
    Min       1Q   Median       3Q      Max
-409.7  -158.0   -27.5    101.5   455.9
```

```
Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -3.475e+06  8.880e+05  -3.914 0.003544 **
A1           1.479e+01  8.472e+01   0.175 0.865281
A2          -3.575e-02  3.341e-02  -1.070 0.312495
A3          -2.020e+00  4.873e-01  -4.146 0.002499 **
A4          -1.033e+00  2.138e-01  -4.831 0.000933 ***
A5          -4.912e-02  2.255e-01  -0.218 0.832448
A6           1.826e+03  4.542e+02   4.019 0.003023 **
```

```
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
Residual standard error: 304 on 9 degrees of freedom
Multiple R-squared:  0.9955,    Adjusted R-squared:  0.9925
F-statistic: 332.3 on 6 and 9 DF,  p-value: 4.853e-10
```