SAINT PETERSBURG STATE UNIVERSITY

Faculty of Applied Mathematics and Control Processes

Mathematical Game Theory and Statistical Decisions Department

Applied Statistics in R

Laboratory work № 4

Professor: Parilina Elena M.

Student: Orlov Ivan M., 19.M09-пу

Saint Petersburg

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mlr02 model is:

*X1 = 0.8614 * X2 + 0.3349 * X3 + 30.9941*

kuiper model is:

*Price = -1.744e-01 * Mileage + 3.864e+03 * Liter + 6.251e+03 * Cruise -2.126e+03 * Sound + 3.436e+03 * Leather + 7.318e+03*

cigarettes model is:

*CO = 0.9626 * Tar -2.6317 * Nicotine -0.1305 * Weight + 3.2022*

Results (with signif. codes denoted as 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1) are:

coeff significance	***	**	*	.	' '	model significance	homoskedasticity	no autocorrelation
mlr02		1	2			FALSE	TRUE	TRUE
kuiper	6					FALSE	FALSE	FALSE
kuiper AIC	6					FALSE	FALSE	FALSE
cigarettes	1				3	FALSE	TRUE	TRUE

Unfortunately, AIC did not create a better model.

```
library(readxl)
library(car)
library(lmtest)
library(MASS)
mlr02 <- read_excel("Datasets/mlr02.xls")

kuiper <- read_excel("Datasets/kuiper.xls")

cigarettes <- read.delim("~/00_mag/ASR/3/Datasets/cigarettes.dat.txt", header=FALSE)
names(cigarettes) = c("Name", "Tar", "Nicotine", "Weight", "CO")

research_lin = function(formula) {
  res = lm(formula = formula)
  print(summary(res))
  print(bptest(formula = res))
  print(dwtest(formula = res))
}

research_aic = function(formula, upper) {
  res = lm(formula = formula)
  step = stepAIC(res, scope = upper, direction = "both", trace = FALSE)
  print(summary(step))
  print(bptest(formula = step))
  print(dwtest(formula = step))
}


research_lin(kuiper$Price ~ kuiper$Mileage + kuiper$Liter + kuiper$Cruise + kuiper$Sound +
kuiper$Leather)
research_aic(formula = kuiper$Price ~ kuiper$Mileage + kuiper$Liter + kuiper$Cruise +
kuiper$Sound + kuiper$Leather,
                    upper = ~ kuiper$Mileage + kuiper$Liter + kuiper$Cruise + kuiper$Sound +
kuiper$Leather)

research_lin(mlr02$X1 ~ mlr02$X2 + mlr02$X3)
research_lin(cigarettes$CO ~ cigarettes$Tar + cigarettes$Nicotine + cigarettes$Weight)
```