ANOVA notes

Halid Kopanski

2022-06-12

```
library(tidyverse)
df_pigs <- read_table("pig_weight.txt")
df_pigs$Drug <- as.factor(df_pigs$Drug)
pig_model1 <- lm(Pigweight ~ ., data = df_pigs)
summary(pig_model1)
```

```
##
## Call:
## lm(formula = Pigweight ~ ., data = df_pigs)
##
## Residuals:
##     Min     1Q Median     3Q    Max
## -3.905 -1.174  0.187  1.351  3.657
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.48163    9.14917   0.818  0.41628
## Drug2       -1.60557    0.52788  -3.042  0.00331 **
## Drug3       -0.70480    0.52871  -1.333  0.18684
## Momweight    0.26363    0.04727   5.578 4.28e-07 ***
## Dadweight    0.17442    0.03465   5.034 3.58e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.855 on 70 degrees of freedom
## Multiple R-squared:  0.4561, Adjusted R-squared:  0.425
## F-statistic: 14.67 on 4 and 70 DF,  p-value: 9.393e-09
```

Null Model

```
null_model <- lm(Pigweight ~ NULL, data = df_pigs)
```

No Drug Model

```
nodrug_model <- lm(Pigweight ~ Momweight + Dadweight, data = df_pigs)
summary(nodrug_model)
```

```
##
## Call:
## lm(formula = Pigweight ~ Momweight + Dadweight, data = df_pigs)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.4473 -1.2429  0.0714  1.2118  4.3556
##
## Coefficients:
##             Estimate Std. Error t value Pr(>|t|)
## (Intercept)  9.48455    9.40944   1.008    0.317
## Momweight    0.25972    0.04951   5.246 1.50e-06 ***
## Dadweight    0.16183    0.03540   4.571 1.96e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.946 on 72 degrees of freedom
## Multiple R-squared:  0.3841, Adjusted R-squared:  0.3669
## F-statistic: 22.45 on 2 and 72 DF,  p-value: 2.651e-08
```

ANOVA

```
anova(pig_model1)
```

```
## Analysis of Variance Table
##
## Response: Pigweight
##            Df  Sum Sq Mean Sq F value     Pr(>F)
## Drug        2  23.718  11.859  3.4473    0.03733 *
## Momweight   1  91.039  91.039 26.4638 2.342e-06 ***
## Dadweight   1  87.175  87.175 25.3407 3.580e-06 ***
## Residuals  70 240.808   3.440
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
anova(null_model, pig_model1)
```

```
## Analysis of Variance Table
##
## Model 1: Pigweight ~ NULL
## Model 2: Pigweight ~ Drug + Momweight + Dadweight
##   Res.Df    RSS Df Sum of Sq      F    Pr(>F)
## 1     74 442.74
## 2     70 240.81  4    201.93 14.675 9.393e-09 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
anova(nodrug_model, pig_model1)
```

```
## Analysis of Variance Table
##
## Model 1: Pigweight ~ Momweight + Dadweight
## Model 2: Pigweight ~ Drug + Momweight + Dadweight
##   Res.Df    RSS Df Sum of Sq      F  Pr(>F)
## 1     72 272.70
## 2     70 240.81  2    31.894 4.6356 0.01286 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```