Alex Fink

11/17/2021

Lab #10

Mike Nelson

Q1 pt.1:

n\_obs = nrow(rope)

data.frame(table(rope$rope.type))

n\_groups = nrow((table(rope$rope.type)))

length(rope$rope.type)

ss\_tot = sum((rope$p.cut - mean(rope$p.cut))^2)

df\_tot = n\_obs -1

agg\_sq\_resids = agg\_sq\_resids = aggregate(

x = rope$p.cut,

by = list(rope$rope.type),

FUN = function(x) sum((x - mean(x))^2))

ss\_within = sum(agg\_sq\_resids$x)

df\_within = n\_obs - n\_groups

ss\_among = ss\_tot-ss\_within

df\_among = n\_groups-1

ms\_within = ss\_within/df\_within

ms\_among = ss\_among/df\_among

f\_ratio = ms\_among/ms\_within

f\_pval = pf(f\_ratio, df\_within, df\_among)

Q1 pt.2:

# number comparison tolerance

digits\_check = 5

# Build the reference model using R functions

fit\_1 = lm(p.cut ~ rope.type, data=rope)

anova(fit\_1)

anova\_fit\_1 = anova(fit\_1)

# Check degrees of freedom

anova\_fit\_1$Df == c(df\_among, df\_within)

# Check sums of squares

round(anova\_fit\_1$`Sum Sq`, digits = digits\_check) == round(c(ss\_among, ss\_within), digits = digits\_check)

# Check mean squares

round(anova\_fit\_1$`Mean Sq`, digits = digits\_check) == round(c(ms\_among, ms\_within), digits = digits\_check)

# Check the F-ratio

round(anova\_fit\_1$`F value`[1], digits = digits\_check) == round(f\_ratio, digits = digits\_check)

# Check the F test statistic p-value

round(anova\_fit\_1$`Pr(>F)`[1], digits = digits\_check) == round(f\_pval, digits = digits\_check)

Q2: Based on the boxplots there is not equal variances among the groups because the boxes are spread out, skewed.

Q3: 0.00143

Q4: ANOVA type analysis is not appropriate on the raw data because it violates the assumption of homogeneity.

Q5: The rope type base case is the intercept, which is 0.367 the Blaze value.

Q6: The mean percent cut is 0.36714. There is no calculation because it is the base case.

Q7: The answer is 0.26. You add the base case to the XTC value.