**Cluster results Lion fish**

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# cluster results

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# DATA: X = XLionFish.csv

#

# The data set is formed by the variables: counts, body condition, body\*100 and

# cluster

colnames(X)

# [1] "N\_chromis" "N\_goby" "N\_wrasse" "BodyCond" "BodyCond100" "Group"

####

# **CoDa center of each group**

# geomean in counts and percentage

# group 1

# (g1<-exp(apply(log(X[X[,6]==1,1:3]),2,mean)))

# in counts

# N\_chromis N\_goby N\_wrasse

# 0.9948448 0.1931161 0.2516762

(g1/sum(g1)\*100)

# in %

# N\_chromis N\_goby N\_wrasse

# 69.10386 13.41422 17.48192

####

# group 2

(g2<-exp(apply(log(X[X[,6]==2,1:3]),2,mean)))

# in counts

# N\_chromis N\_goby N\_wrasse

# 1.2688500 1.6358436 0.3688886

(g2/sum(g2)\*100)

# in %

# N\_chromis N\_goby N\_wrasse

# 38.76029 49.97106 11.26865

#

# RATIO BETWEEN BOTH CENTERS

(g1/sum(g1)\*100)/(g2/sum(g2)\*100)

# N\_chromis N\_goby N\_wrasse

# 1.7828520 0.2684398 1.5513761

###

# INTERPRETATION: for instance: group1 eats 1.78 times N\_chromis more than

# group2

#

# IS IT SIGNIFICANT THESE DIFFERENCES? T^2 hotelling test

# T^2 : H\_0 mu\_1=mu\_2

# centers expressed in coordinates

x<-filr(X[X[,6]==1,1:3])

y<-filr(X[X[,6]==2,1:3])

library(rrcov)

T2.test(x,y)

# RESUTS Two-sample Hotelling test

#

# data: x and y

# T2 = 69.023, F = 32.594, df1 = 2, df2 = 17, **p-value = 1.524e-06**

# alternative hypothesis: true difference in mean vectors is not equal to (0,0)

# sample estimates:

# Var1 Var2

# mean x-vector 1.1591569 0.452989

# mean y-vector -0.1796388 1.112391

# **INTEPRETATION: the differences between the compositions, in average,**

**# are significant**

# ========================================

# **Repeat the same for the body condition**

# BODY condition

hist(X[,4])

summary(X[,4])

# not skewed, not log is required

# mean bodu condition for group 1 and group 2

(b1<-mean(X[X[,6]==1,4]))

# 0.01447846

(b2<-mean(X[X[,6]==2,4]))

# 0.01245429

# t test

t.test(X[X[,6]==1,4],X[X[,6]==2,4])

# Welch Two Sample t-test

#

# data: X[X[, 6] == 1, 4] and X[X[, 6] == 2, 4]

# t = 2.9424, df = 13.411, **p-value = 0.01112**

# alternative hypothesis: true difference in means is not equal to 0

# 95 percent confidence interval:

# 0.0005426049 0.0035057467

# sample estimates:

# mean of x mean of y

# 0.01447846 0.01245429

# INTERPRETATION: **SIGNIFICANT DIFFERENCES between the two groups**

**# (asuming diff variances)**

# =========================

# **repeat the same for index of preference**

hist(lindexS)

summary(lindexS)

# not left skewed, not log is required

(l1<-mean(lindexS[X[,6]==1]))

# 0.9988722

(l2<-mean(lindexS[X[,6]==2]))

# 0.8266204

t.test(lindexS[X[,6]==1],lindexS[X[,6]==2])

# Welch Two Sample t-test

#

# data: lindexS[X[, 6] == 1] and lindexS[X[, 6] == 2]

# t = 2.2166, df = 6.0001, **p-value = 0.06852 (assuming differ vars)**

# alternative hypothesis: true difference in means is not equal to 0

# 95 percent confidence interval:

# -0.01789552 0.36239904

# sample estimates:

# mean of x mean of y

# 0.9988722 0.8266204

t.test(lindexS[X[,6]==1],lindexS[X[,6]==2],var.equal=TRUE)

# Two Sample t-test

#

# data: lindexS[X[, 6] == 1] and lindexS[X[, 6] == 2]

# t = 3.0953, df = 18, **p-value = 0.006243 (assuming equal vars)**

# alternative hypothesis: true difference in means is not equal to 0

# 95 percent confidence interval:

# 0.05533737 0.28916615

# sample estimates:

# mean of x mean of y

# 0.9988722 0.8266204

summary(cbind(lindexS[X[,6]==1],lindexS[X[,6]==2]))

var.test(lindexS[X[,6]==1],lindexS[X[,6]==2])

# F test to compare two variances

#

# data: lindexS[X[, 6] == 1] and lindexS[X[, 6] == 2]

# F = 8.2255e-06, num df = 12, denom df = 6, **p-value < 2.2e-16 (not equal vars)**

# alternative hypothesis: true ratio of variances is not equal to 1

# 95 percent confidence interval:

# 1.532815e-06 3.066691e-05

# sample estimates:

# ratio of variances

# 8.225457e-06

wilcox.test(lindexS[X[,6]==1],lindexS[X[,6]==2])

# Wilcoxon rank sum test with continuity correction

#

# data: lindexS[X[, 6] == 1] and lindexS[X[, 6] == 2]

# W = 91, p-value = 0.000339

# alternative hypothesis: true location shift is not equal to 0

# **INTERPRETATION: the differences between the index of preference is not significant using t.test but it is significant using wilcoxon.text (‘Mann-Whitney’ test). The outliers has an important weight here**.