Analysis_TurnAngle_SpatDisc

Anna Steel

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Turning Angles

Using dataset filtered and discretized by distance, we will calculate the turning angles

get data

```
red.r21 <- readRDS("Maestros/RediscSpat_27m.RData")

 options(digit.secs = 6)
 red.r21$date = as.POSIXct(red.r21$date)
```

clean data

autocorrelation eval; isn't working yet

mean bearings and turning angles - unsure if this is correct! Check conversion to bearings wth mo's for-loop and function ('bearing()')

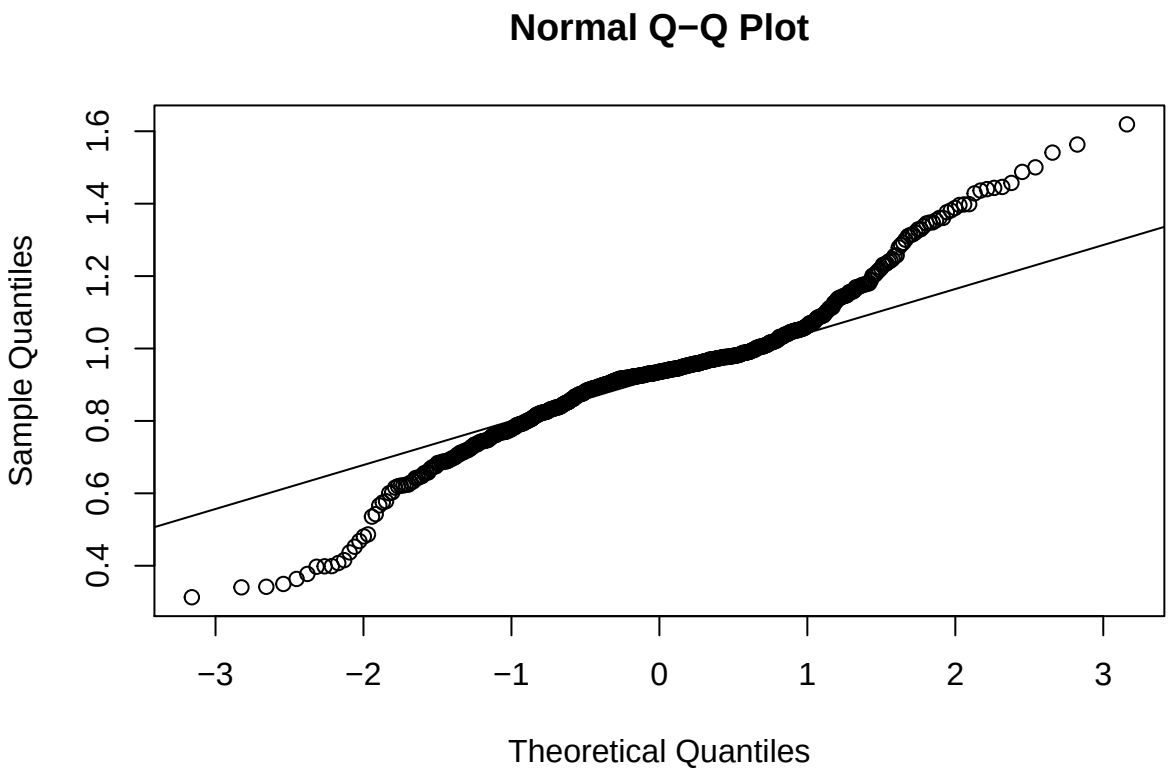
```
## Calculate mean bearings and turn angles for each fish so we can use standard statistics on independe
   red.indivmn = as.data.frame(summarise(group_by(red.r21, id, RelEv),
          mn.bearing=as.numeric(mean.circular(circular(compass.angle, units="degrees"))),  # use circul
          mn.turndeg=as.numeric(mean(abs(rel.deg), na.rm=T)) ))  # because these are +/- values from st


  ##  Look at normality and heterogeneity of variance
    # check for homogeneitry of var for subsequent ANOVA
      bartlett.test(red.indivmn$mn.bearing~red.indivmn$RelEv)
```

```
##
##  Bartlett test of homogeneity of variances
##
## data:  red.indivmn$mn.bearing by red.indivmn$RelEv
## Bartlett's K-squared = 120.08, df = 4, p-value < 2.2e-16
```

```
        # Bartlett's K-squared = .38811, p=0.533

    # check for ~N
      #windows()
       qqnorm(red.indivmn$mn.bearing/60)
       qqline(red.indivmn$mn.bearing/60)
```




```
   # not perfect but not tooo bad


# From Lix et al 1996, the Welch test is the least sensitive (in terms of type 1 error) to skew/k
#  but this is still a parametric test that compares means (assumes means describe the distributi
pt.Welch.aov = oneway.test(red.indivmn$mn.bearing ~ factor(red.indivmn$RelEv))
   # F = 29.166, num df = 1, denom df = 427.53, p-value = 0.0000001104
library(userfriendlyscience)
```

```
##
## Attaching package: 'userfriendlyscience'
```

```
## The following object is masked from 'package:lattice':
##
##     oneway
```

```
posthocTGH(y=red.indivmn$mn.bearing, x=factor(red.indivmn$RelEv)  )
```

```
##     n means variances
## 1 216    53        64
## 2 214    57        68
## 3 125    56       249
## 4  39    59       251
## 5  40    63       155
```

```
##
##        t  df       p
## 1:2 4.19 427 0.00033
## 1:3 1.84 162 0.35375
## 1:4 2.12  42 0.23143
## 1:5 4.77  45 0.00018
## 2:3 0.33 164 0.99747
## 2:4 0.85  42 0.91269
## 2:5 3.15  46 0.02270
## 3:4 0.93  63 0.88253
## 3:5 2.87  82 0.04023
## 4:5 1.32  72 0.67710
```