Diversity indexes

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Loading packages

```
library(pacman)
pacman::p_load(tidyverse, vegan, iNEXT, nlme, readxl, writexl)
```

Loading Data

```
df <- readxl::read_excel("uniao.xlsx")
```

Getting only the necessary variables

```
df <- df[, c("Kingdom", "Phylum", "Diabasadden", "Longyearbyen")]
df <- df %>%
  filter(Kingdom != "Unknown")
```

Creating the results data frame

```
index <- data.frame(
  Kingdom = character(0),
  Phylum = character(0),
  Local = character(0),
  Margalef = numeric(0),
  Shannon = numeric(0),
  Simpson = numeric(0),
  Evenness = numeric(0),
  Falpha = numeric(0)
)
```

getting all indices in automatized way

```
for(i in unique(df$Kingdom)){
  filo <- df %>%
    filter(Kingdom == i)

  for(j in unique(filo$Phylum)){
    species <- filo %>%
      filter(Phylum == j)

    #matrix treatment

    dados <- t(species[, c("Diabasadden", "Longyearbyen")])
    matriz_dados <- data.matrix(dados)

    #margalef
    riqueza <- specnumber(matriz_dados)
    abundancia <- apply(matriz_dados, 1, sum)
```

```
    Margalef <- round( (riqueza - 1) / log(abundancia) , 2)

    #shannon
    shannon <- diversity(matriz_dados, index="shannon", MARGIN = 1)
    if(length(shannon) < 2){
      shannon[[2]] <- NA
    }

    #simpson
    simpson = diversity(matriz_dados, index="simpson", MARGIN = 1)
    if(length(simpson) < 2){
      simpson[[2]] <- NA
    }

    #evenness
    J <- (diversity(matriz_dados)) / (log(specnumber(matriz_dados)))

    #fisher's Alpha
    alpha <- fisher.alpha(matriz_dados)
    if(length(alpha) < 2){
      alpha[[2]] <- NA
    }

    index <- rbind(index, data.frame(
      Kingdom = i,
      Phylum = j,
      Local = names(Margalef)[1],
      Margalef = Margalef[[1]],
      Shannon = shannon[[1]],
      Simpson = simpson[[1]],
      Evenness = J[[1]],
      Falpha = alpha[[1]]
    ))

    index <- rbind(index, data.frame(
      Kingdom = i,
      Phylum = j,
      Local = names(Margalef)[[2]],
      Margalef = Margalef[[2]],
      Shannon = shannon[[2]],
      Simpson = simpson[[2]],
      Evenness = J[[2]],
      Falpha = alpha[[2]]
    ))
  }

}
```

writing an excel file

```
write_xlsx(index, "indices.xlsx")
```