Plot Simplices

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```
##### Packages ####
library(FredsVietorisRips)
```

Simplices, 0 and 1

To create our 1-simplices,

Step 1: We generate a data frame of random x and y coordinates

Step 2: We create a matrix of pairwise distances. Each cell i, j represents the distance from the ith point to the jth point.

Step 3: Given a distance, ϵ, we return an adjacency matrix which displays a 1 for each pair whose Euclidean Distance is within the given ϵ value

Step 4: From the adjacency matrix, we pull out the points which are adjacent. This is a list of all 1-simplexes in the dataset

Step 5: Last, we visualize the simplices using the 'ggplot2' library

```
##### Step 1: Create Data Frame ####
frame_size <- 100
df <- data.frame(
  x = runif(frame_size),
  y = runif(frame_size),
  Point = paste0("P", c(1:frame_size))
)

##### Step 2: Pairwise Distance Matrix ####

pwdmat <- Pairwisedist(df$x, df$y)
# pwdmat

##### Step 3: Given epsilon, determine Adjacency ####
# Given epsilon
epsilon <- 0.1

# Determine Adjacency
adjacency_matrix <- AdjacencyMatrix(pwdmat, epsilon)
# adjacency_matrix
```

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##### Step 4: Which Points are Adjacent? ####
paired_points <- AdjacentPairs(adjacency_matrix)
# paired_points

##### Step 5: Plot 0 and 1 Simplices ####
Plot_1_Simplices(df$x, df$y, epsilon)
```