

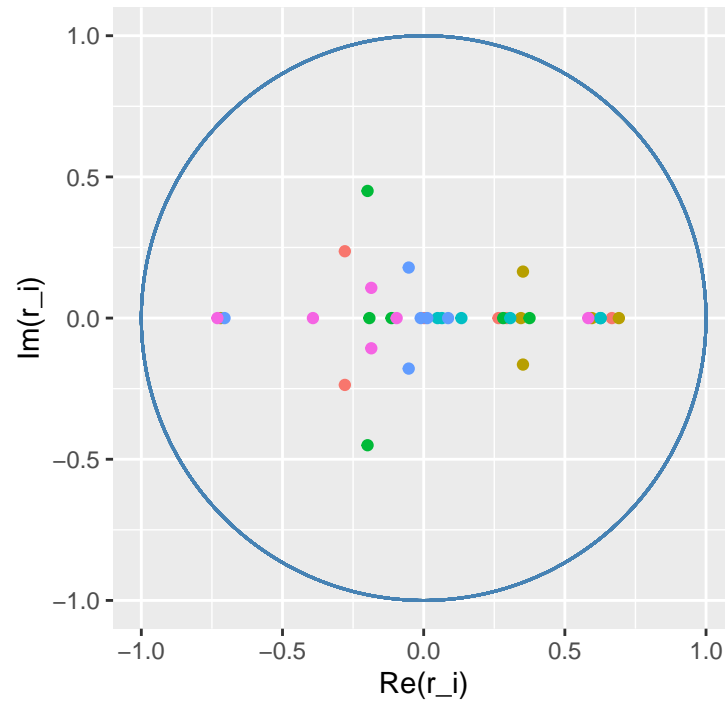
Sparsity Analysis

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Demonstration

```
# Set parameters
M <- 6
p <- 0.5
# Generate matrix (Erdos-Renyi)
P <- RM_erdos(M, p)
# Get eigenvalues
eigen_df <- eigen_frame(P)
eigen_plot(P, mat_type = "Erdos-Renyi")
```

Eigenvectors: Erdos-Renyi Matrix

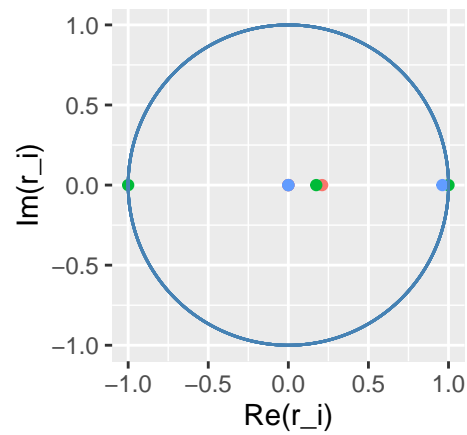


Various Parameter Values

```
M_vec <- c(3,5,10)
p_vec <- c(0.1,0.5,0.8)
c(M1,M2,M3) %<-% M_vec
c(p1,p2,p3) %<-% p_vec
P_vec1 <- matrix(c(RM_erdos(M1,p1),
                    RM_erdos(M1,p1),
                    RM_erdos(M1,p1)),
                 nrow = M_vec[1])
P_vec2 <- matrix(c(RM_erdos(M2,p2),
                    RM_erdos(M2,p2),
                    RM_erdos(M2,p2)),
                 nrow = M_vec[2])
P_vec3 <- matrix(c(RM_erdos(M3,p3),
                    RM_erdos(M3,p3),
                    RM_erdos(M3,p3)),
                 nrow = M_vec[3])
```

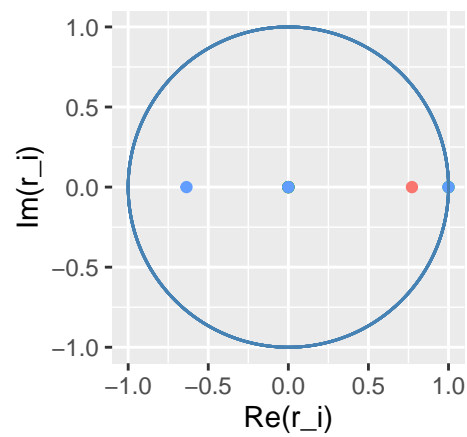
Erdos-Renyi Matrices ($M = 3$)

Eigenvectors: 0.1-Sparse Matrix



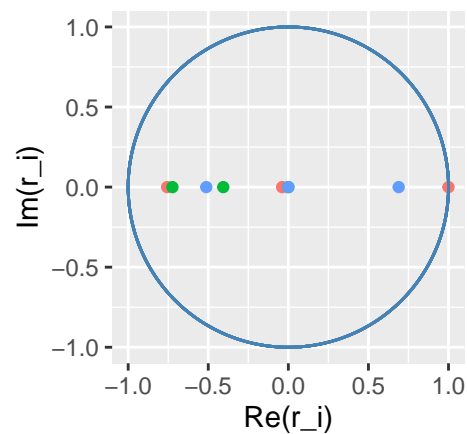
```
## [1] "Proportion of real-valued rows: 1"
```

Eigenvectors: 0.5-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 1"
```

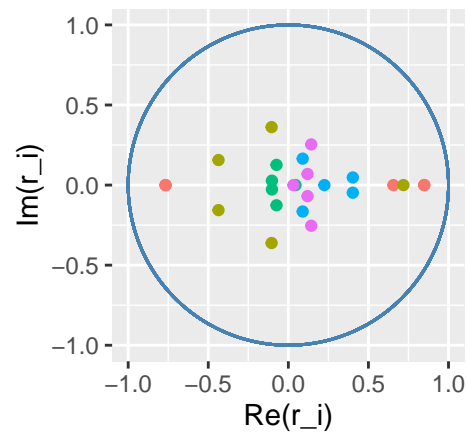
Eigenvectors: 0.8-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 1"
```

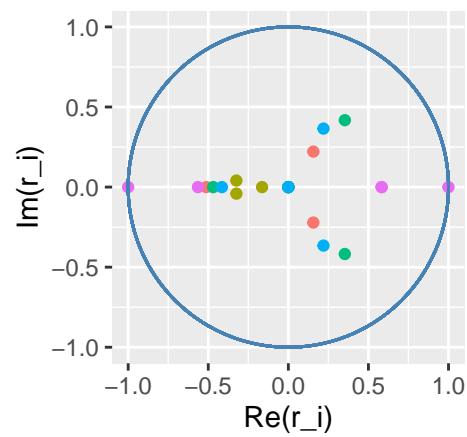
Erdos-Renyi Matrices ($M = 5$)

Eigenvectors: 0.1-Sparse Matrix



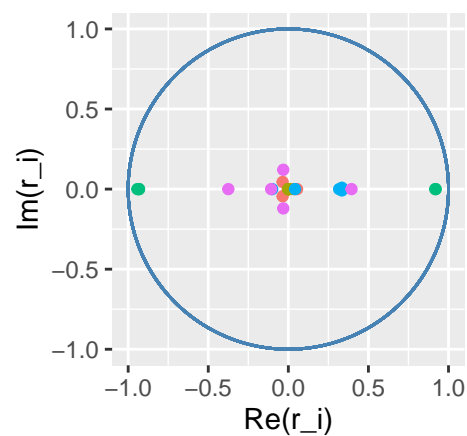
```
## [1] "Proportion of real-valued rows: 0.2"
```

Eigenvectors: 0.5-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 0.2"
```

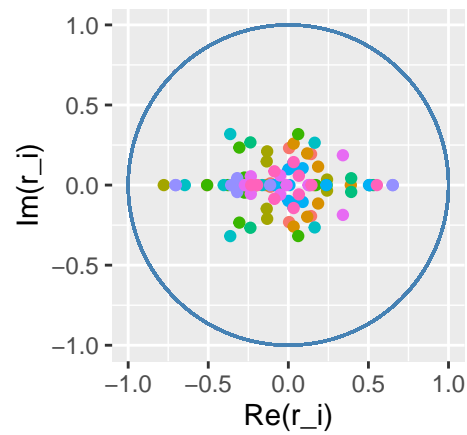
Eigenvectors: 0.8-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 0.4"
```

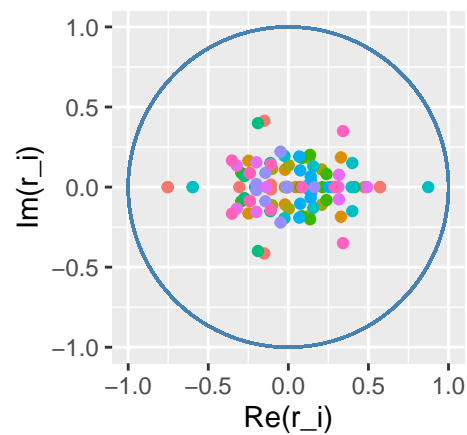
Erdos-Renyi Matrices ($M = 10$)

Eigenvectors: 0.1-Sparse Matrix



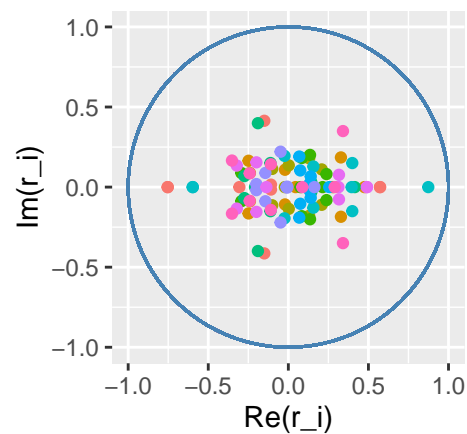
```
## [1] "Proportion of real-valued rows: 0"
```

Eigenvectors: 0.5-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 0"
```

Eigenvectors: 0.8-Sparse Matrix



```
## [1] "Proportion of real-valued rows: 0"
```