Random Matrix Analysis

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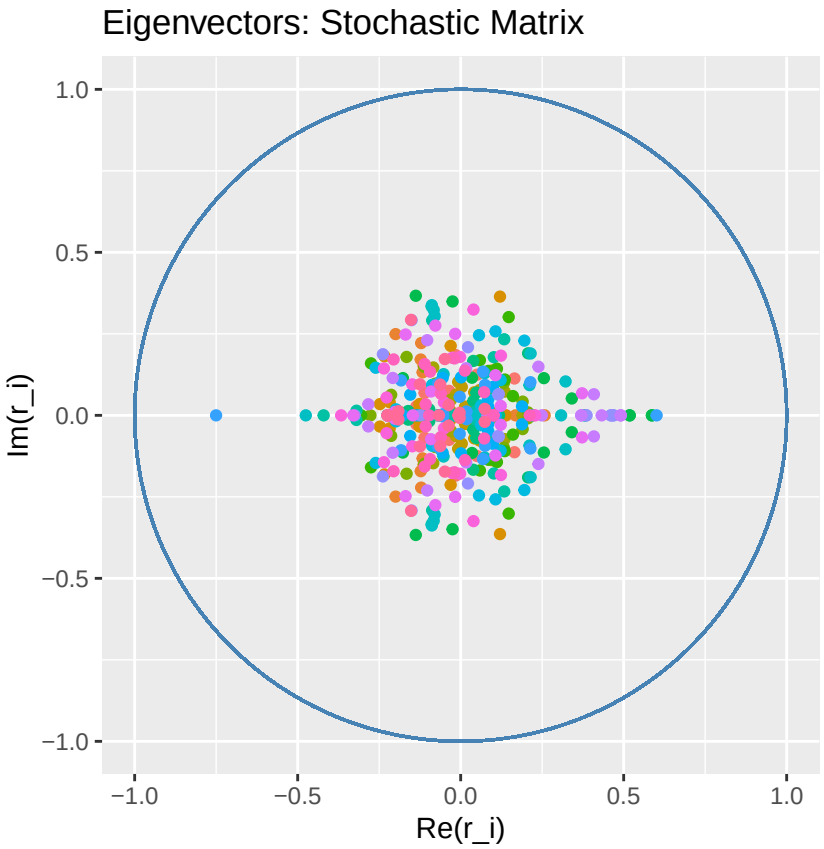
```
bool_plot <- T
bool_loud <- F
M <- 20
```

Eigenmetrics of Various Random Matrices

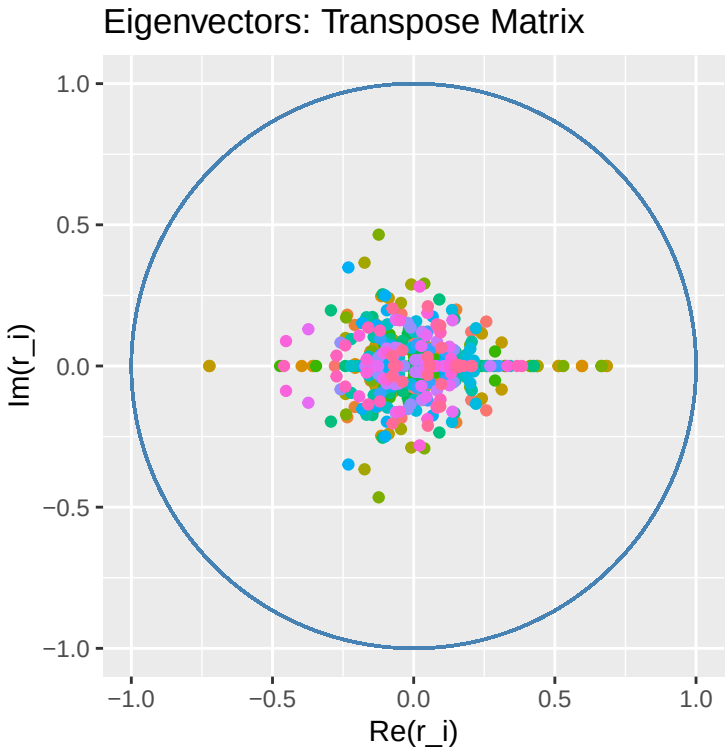
Stochastic Matrix

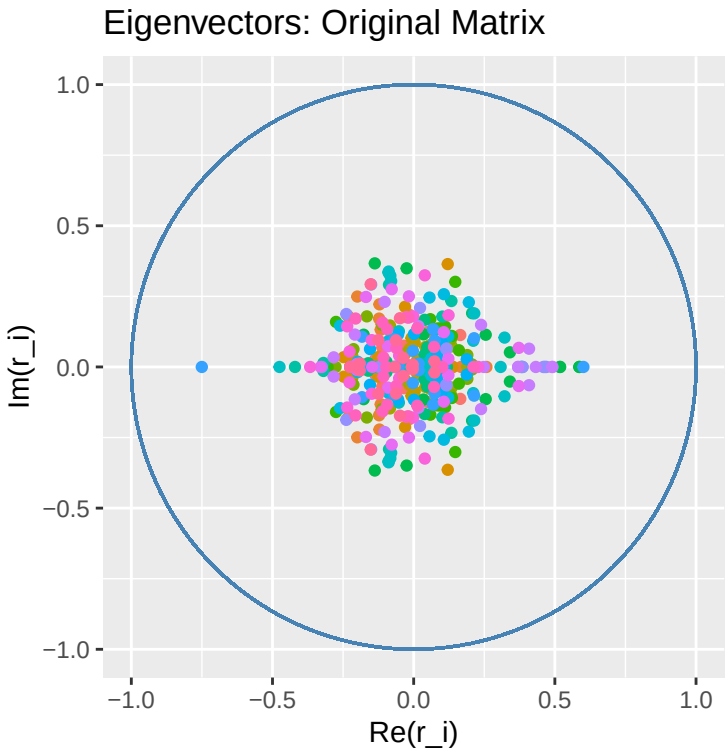
```
P <- rand_M_stoch(M, row_fn = r_zeros)
if(bool_plot){eigen_plot(P, loud = bool_loud, "Stochastic")}
```




```
eigen_summary(eigen_frame(P))
```

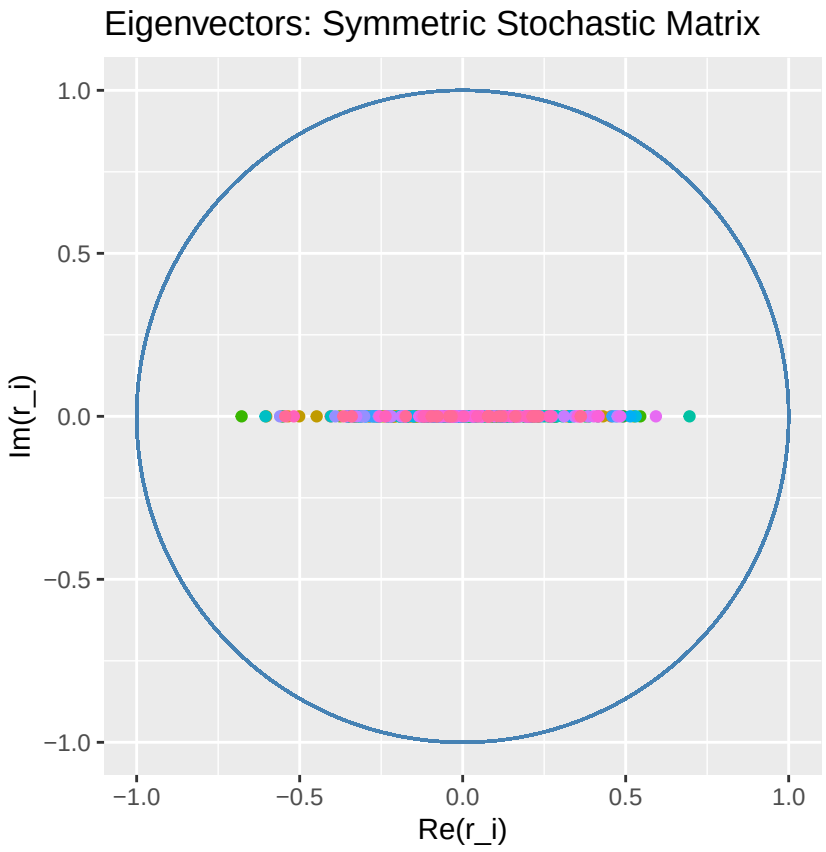
```
## [1] "Proportion of real-valued rows: 0"
```


Eigenvectors: Transpose Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)


Eigenvectors: Original Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)

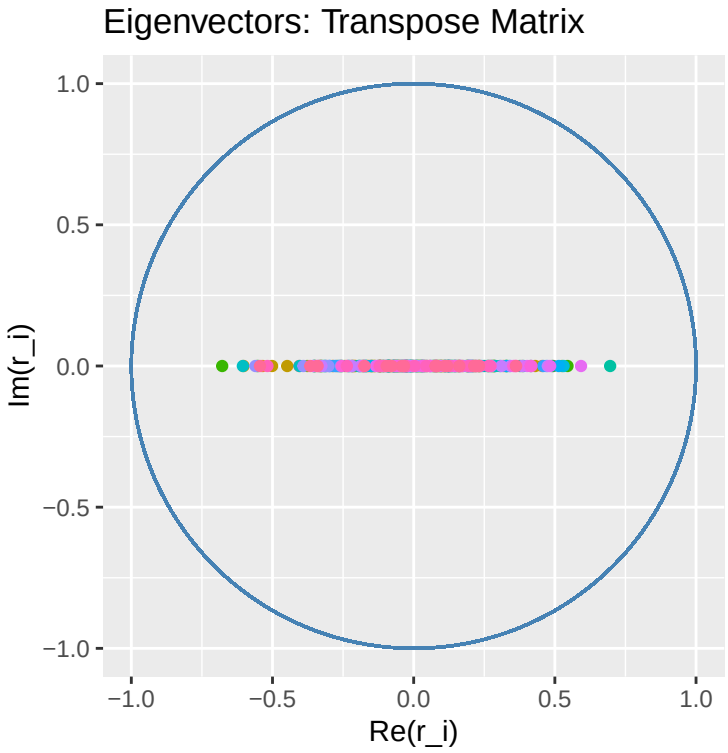
Symmetric Stochastic Matrix

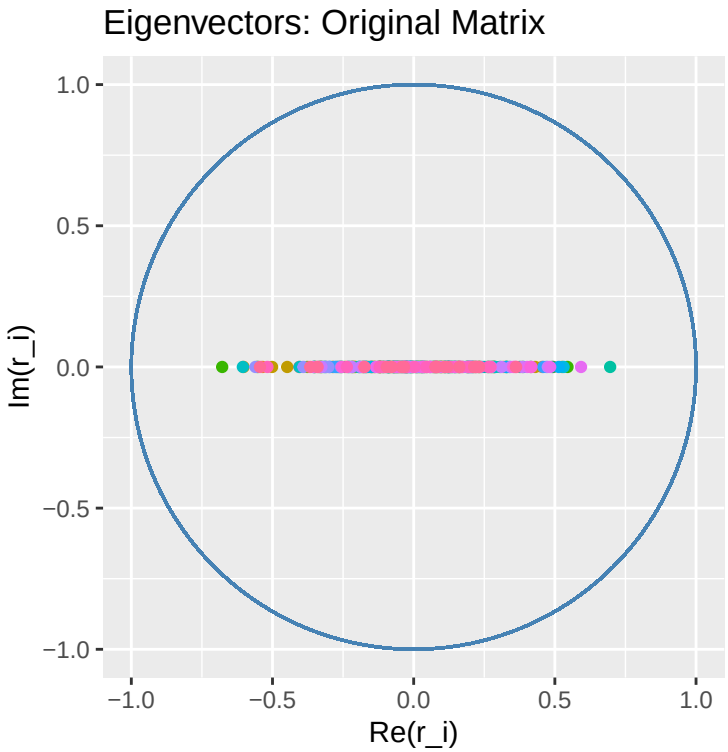
```
set.seed(23)
P <- rand_M_symm_stoch(M, row_fn = r_zeros)
if(bool_plot){eigen_plot(P, loud = bool_loud, "Symmetric Stochastic")}
```




```
eigen_summary(eigen_frame(P))
```

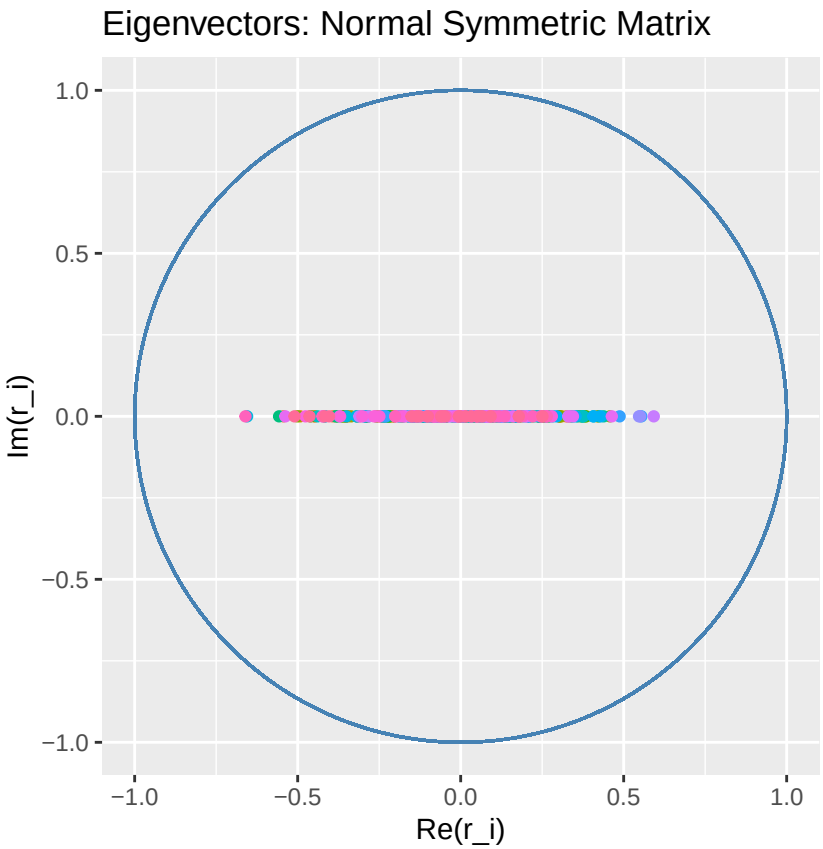
```
## [1] "Proportion of real-valued rows: 1"
```


Eigenvectors: Transpose Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)


Eigenvectors: Original Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)

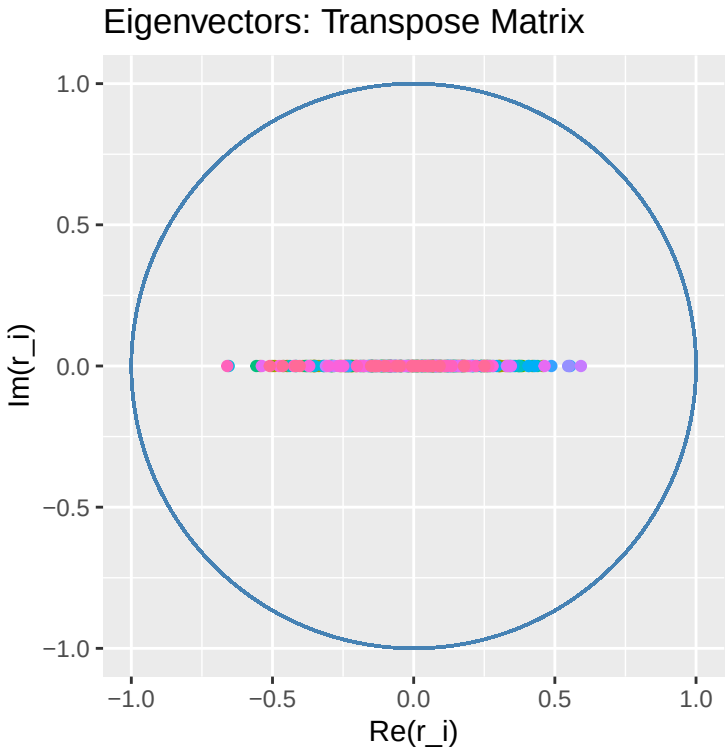
Normal Symmetric Matrix

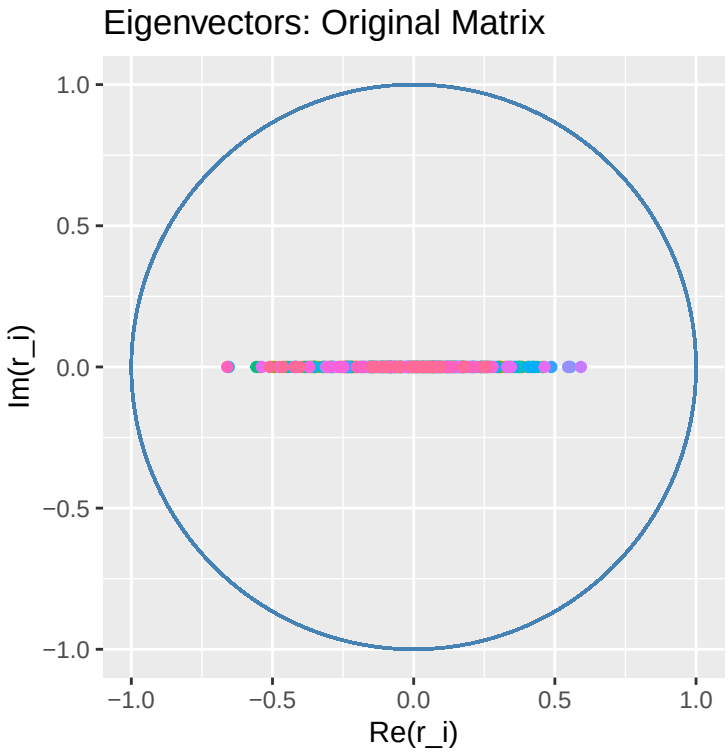
```
set.seed(23)
P <- rand_M_symm_norm(M, mu = 0, sd = 1)
if(bool_plot){eigen_plot(P, loud = bool_loud, "Normal Symmetric")}
```




```
eigen_summary(eigen_frame(P))
```

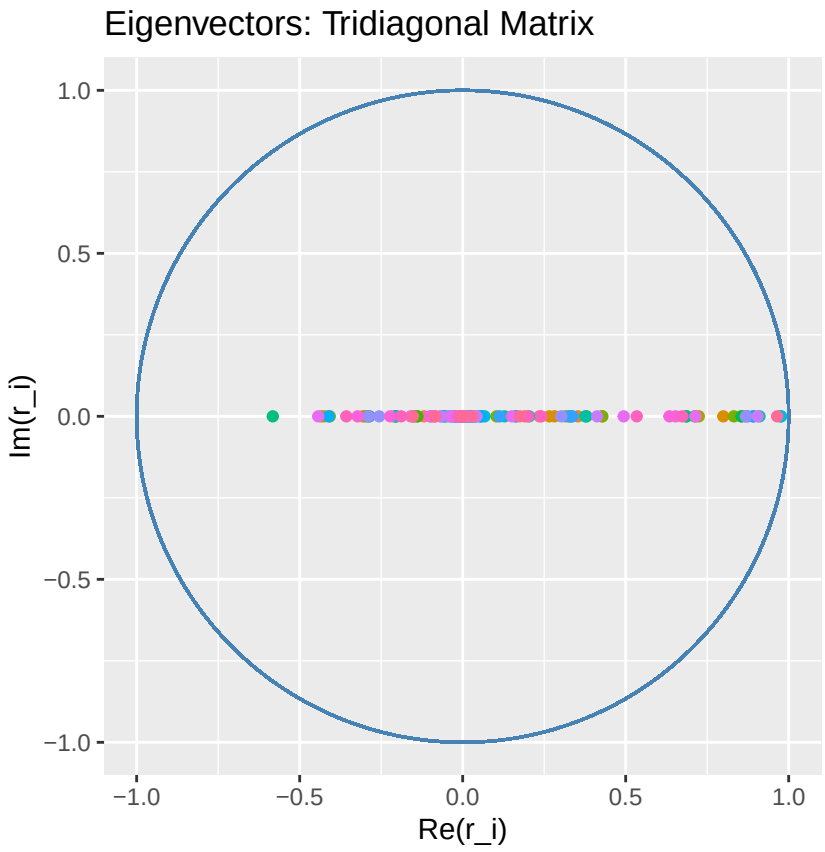
```
## [1] "Proportion of real-valued rows: 1"
```


Eigenvectors: Transpose Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)


Eigenvectors: Original Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)

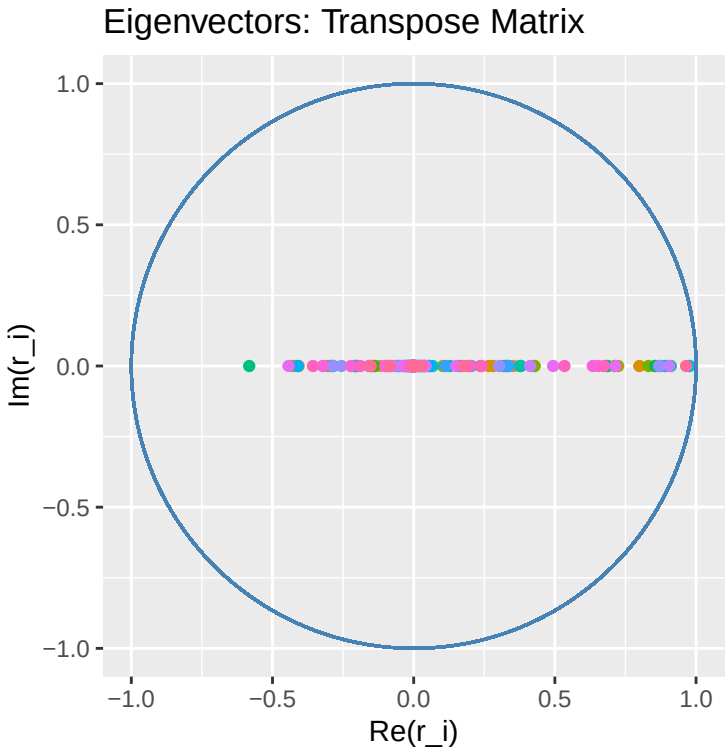
Tridiagonal Matrix

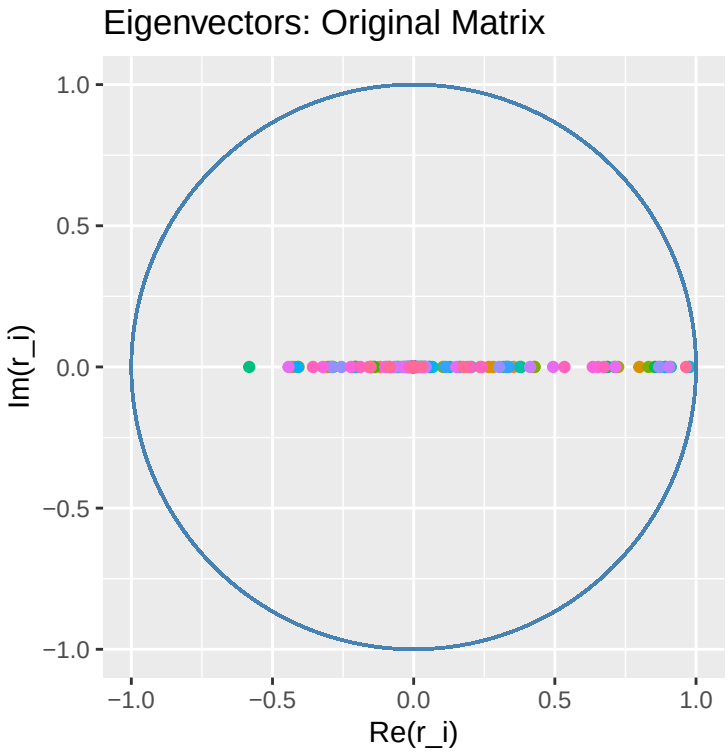
```
set.seed(23)
P <- rand_M_trid(M)
if(bool_plot){eigen_plot(P, loud = bool_loud, "Tridiagonal")}
```




```
eigen_summary(eigen_frame(P))
```

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


Eigenvectors: Transpose Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)


Eigenvectors: Original Matrix
1.0
0.5
0.0
−0.5
−1.0
Im(r_i)
−1.0
−0.5
0.0
0.5
1.0
Re(r_i)