Polished

Taqi

```
norm_ens <- RME_norm(N = 20, herm = T, size = 100)
```

```
disp_ens <- dispersion(norm_ens)
mean(disp_ens$id_diff)
```

```
## [1] 0.8190106
```

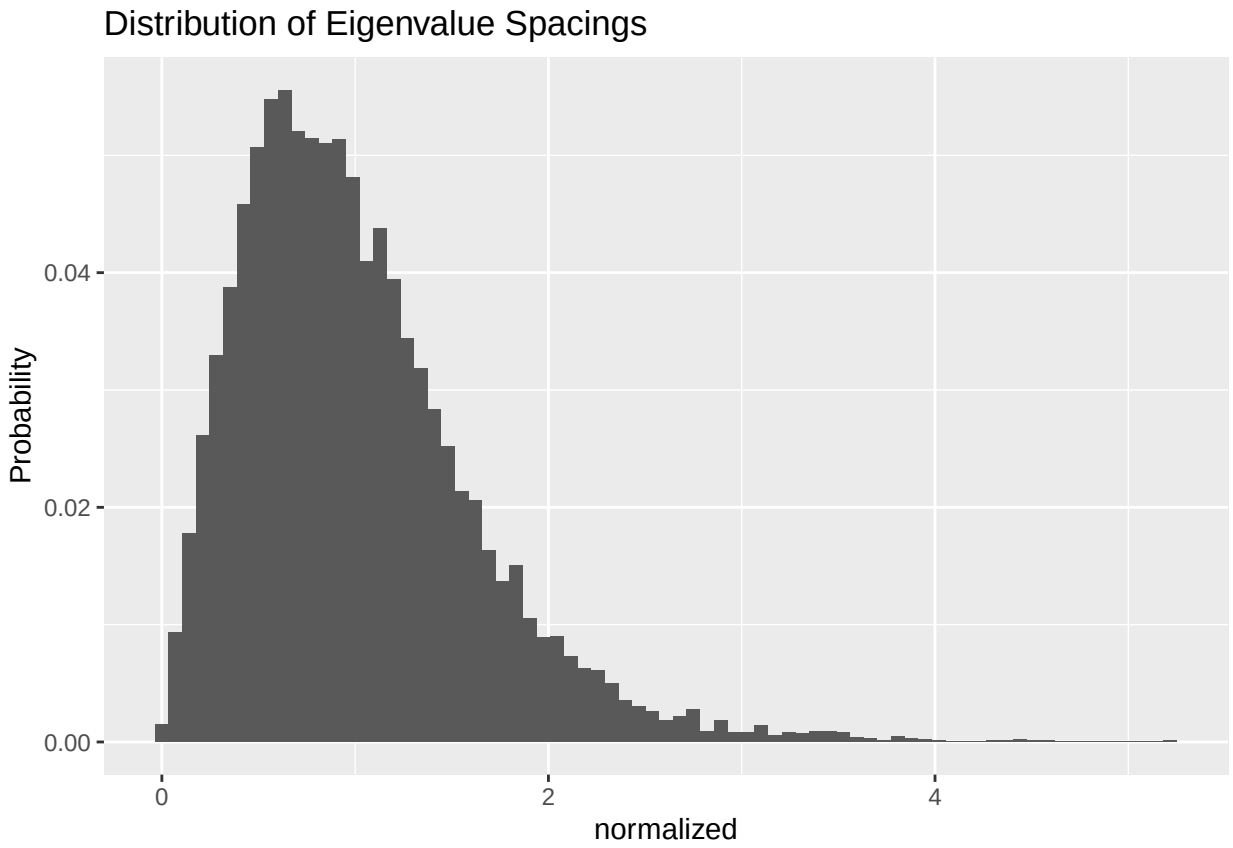
```
# Find the eigenvalue dispersions for a given matrix
.dispersion_matrix2 <- function(P, pairs, sortByNorm, norm_pow, digits = 4){
  eigenvalues <- spectrum(P, sortByNorm = sortByNorm) # Get the sorted eigenvalues of the matrix
  norm_fn <- function(x){(abs(x))^norm_pow} # Generate norm function to pass along as argument (Euclide
  disp <- purrr::map2_dfr(pairs[,1], pairs[,2], .resolve_dispersion, eigenvalues, norm_fn, digits) # Ev
  disp$normalized <- disp$id_diff / mean(disp$id_diff)
  disp
}

dispersion2 <- function(array, pairs = NA, sortByNorm = NA, norm_pow = 1){ #sortNorms? orderByNorms? pa
  digits <- 4 # Digits to round values to
  pairs <- .parsePairs(pairs, array) # Parse input and generate pair scheme (default NA), passing on ar
  # Array is a matrix; call function returning dispersion for singleton matrix
  if(class(array) == "matrix"){.dispersion_matrix2(array, pairs, sortByNorm, norm_pow, digits)}
  # Array is an ensemble; recursively row binding each matrix's dispersions
  else if(class(array) == "list"){purrr::map_dfr(array, .dispersion_matrix2, pairs, sortByNorm, norm_pow
}
```

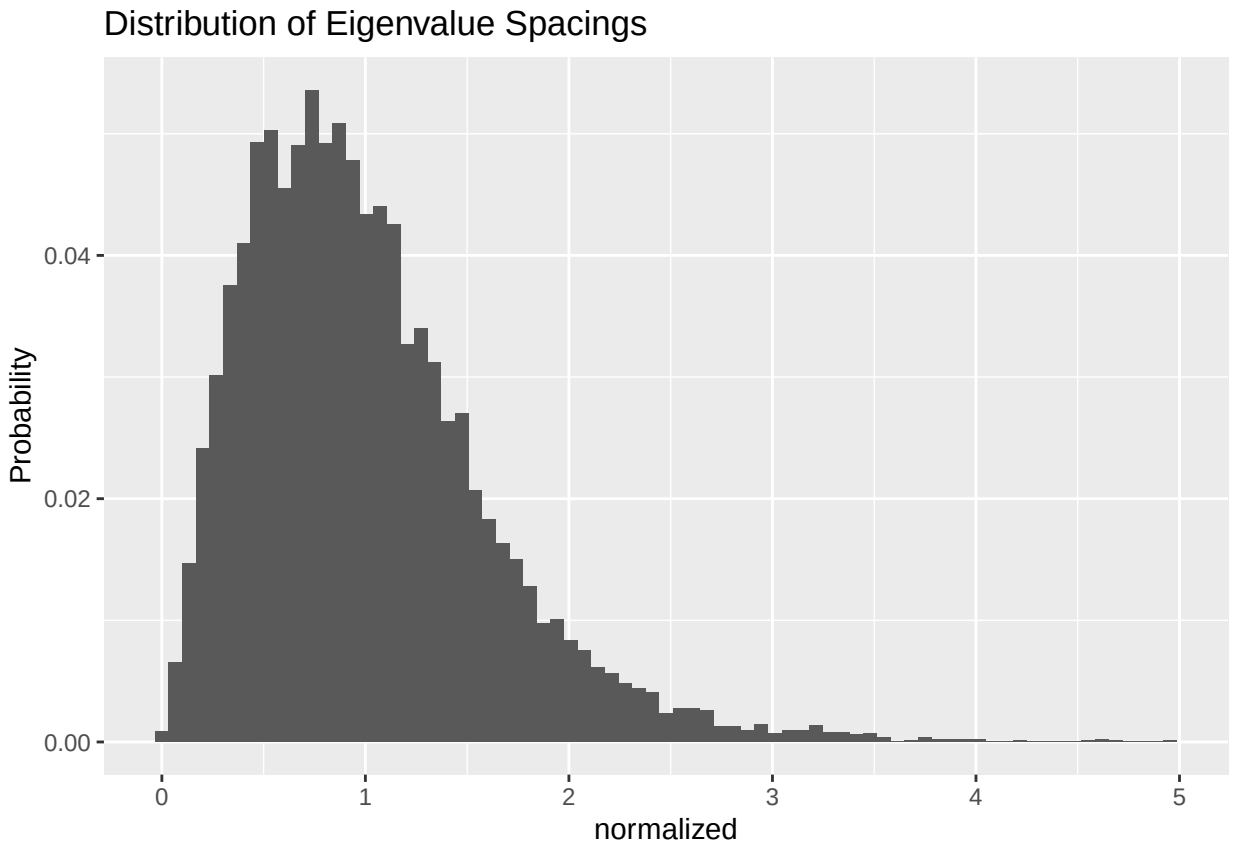
```
#disp <- norm_ens %>% dispersion2(pairs = "consecutive")
#disp %>% dispersion.histogram("normalized", bins = 75)
```

```
# Currently impleneted with real eigenvalues in mind (symmetric real matrices)
normalized_dispersion <- function(array){
  disp <- array %>% dispersion2(pairs = "consecutive")
  disp %>% dispersion.histogram("normalized", bins = 75)
}
```

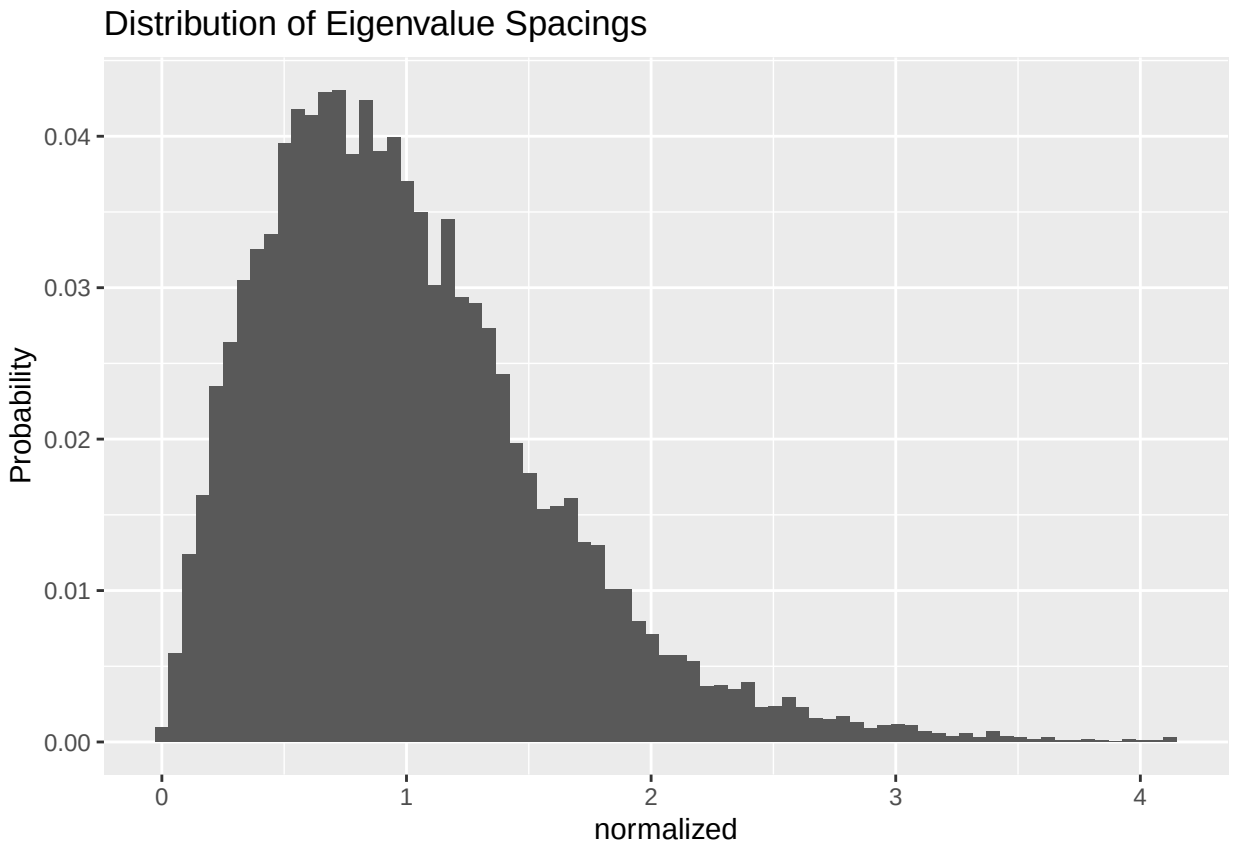
```
N <- 30
size <- 350
RME_norm(N = N, sd = 0.01, symm = T, size = size) %>% normalized_dispersion()
```



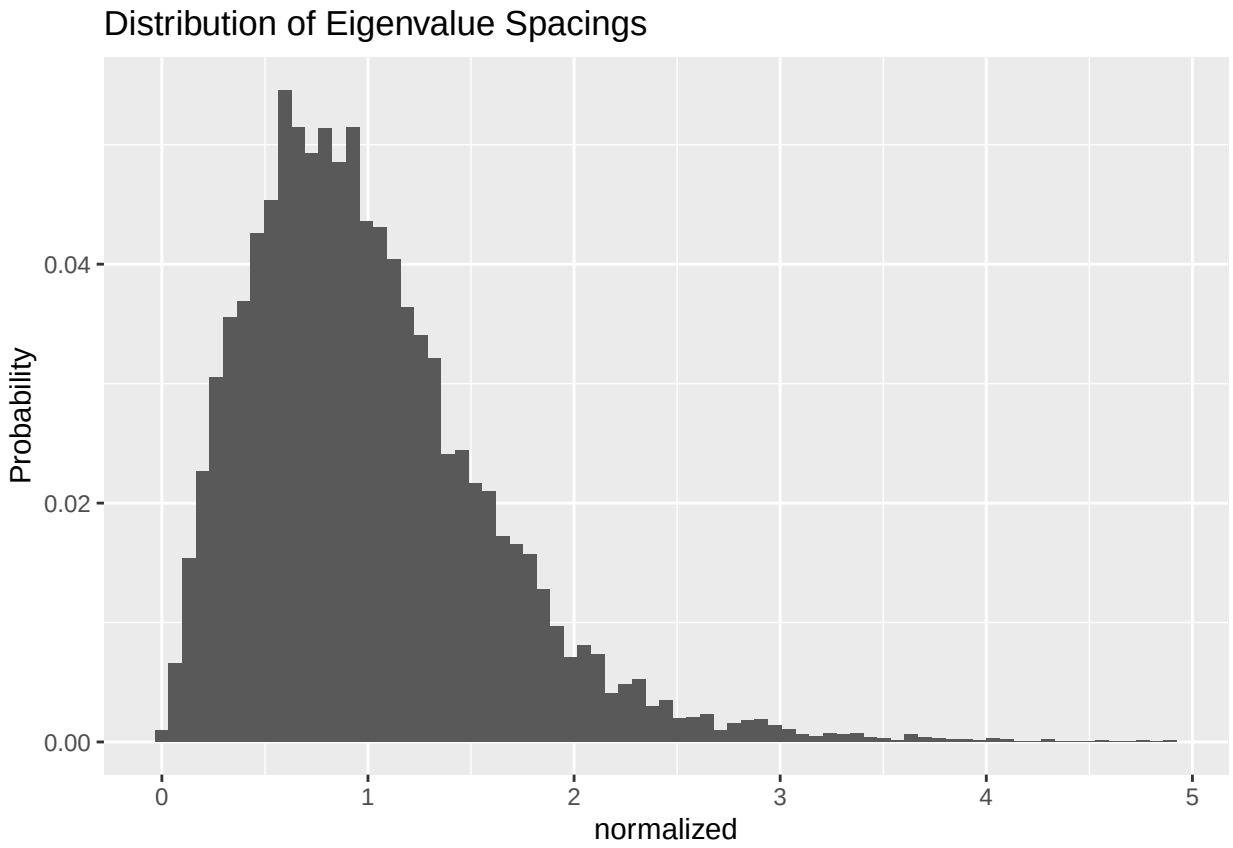

```
RME_norm(N = N, sd = 0.1, symm = T, size = size) %>% normalized_dispersion()
```



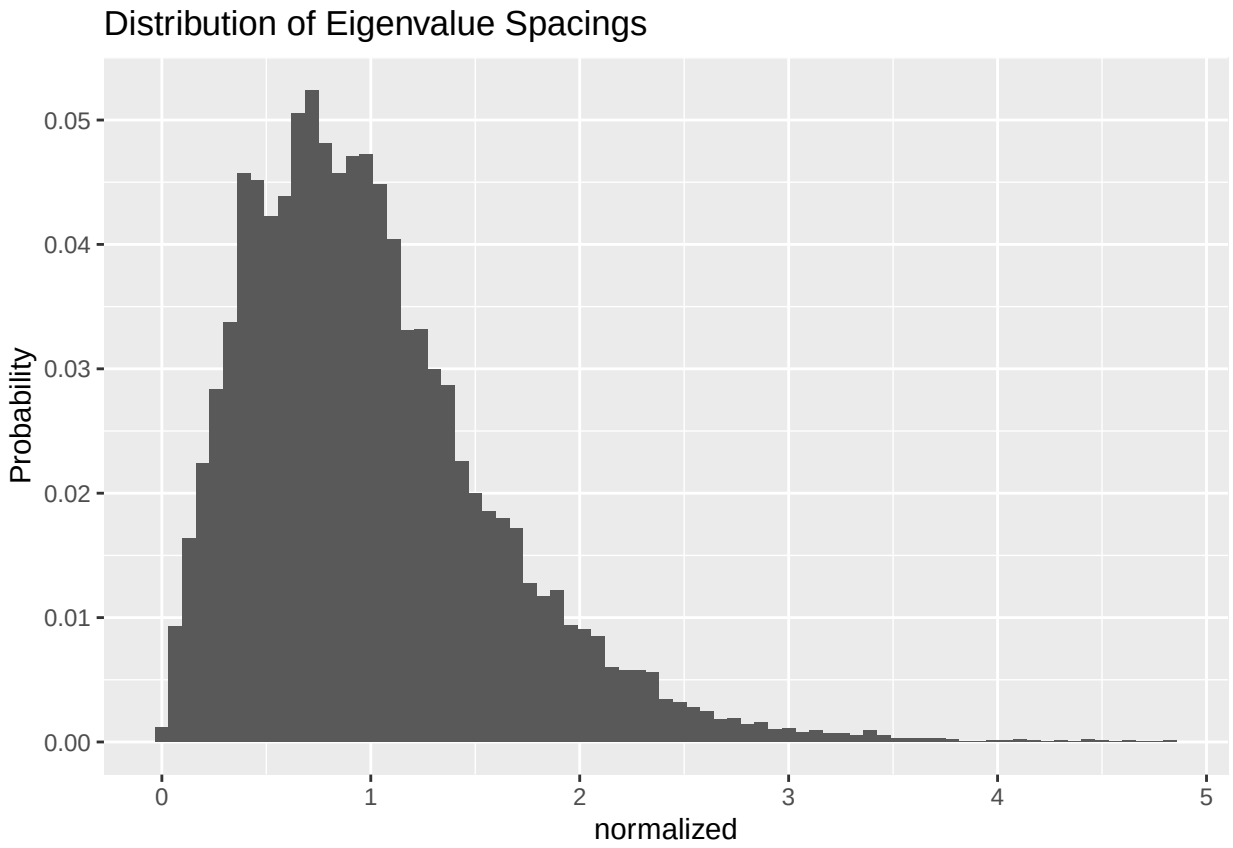

```
RME_norm(N = N, sd = 5, symm = T, size = size) %>% normalized_dispersion()
```



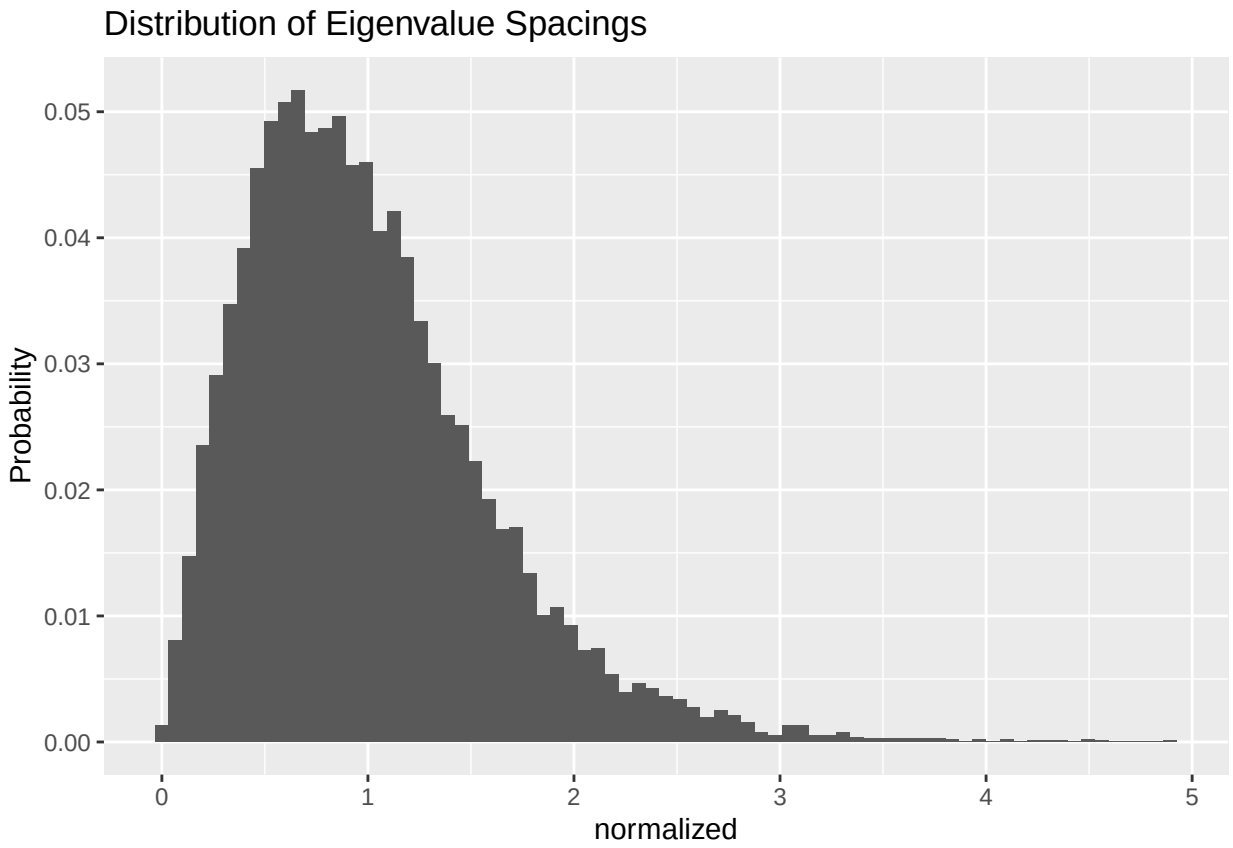

```
RME_norm(N = N, sd = 10, symm = T, size = size) %>% normalized_dispersion()
```



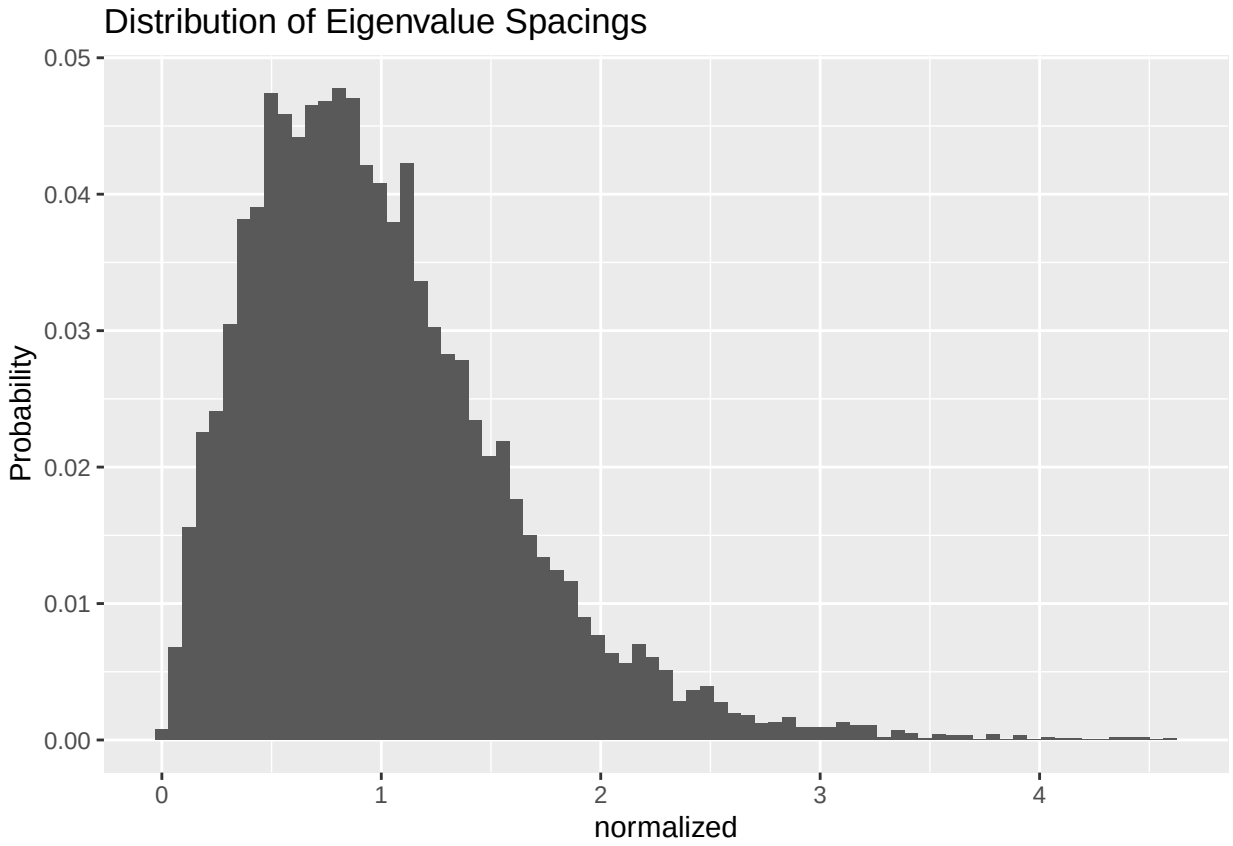

```
RME_norm(N = N, sd = 20, symm = T, size = size) %>% normalized_dispersion()
```




```
RME_norm(N = N, sd = 50, symm = T, size = size) %>% normalized_dispersion()
```




```
RME_norm(N = N, sd = 100, symm = T, size = size) %>% normalized_dispersion()
```


Distribution of Eigenvalue Spacings
Probability
0.05
0.04
0.03
0.02
0.01
0.00
0
1
2
3
4
normalized