Computational Eigenvector Simulation

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Step 0: Setup the matrix

```
# Set seed
set.seed(23)
# Set parameters
M <- 2
mu <- 0
sd <- 1
# Generate matrix
P <- RM_stoch(M, symm = T, sparsity = F)
```

```
eigen_frame(P)
```

```
##         Re Im row_i
## 1 -0.72033  0     1
## 2  0.69363  0     1
## 3 -0.69363  0     2
## 4 -0.72033  0     2
```

Step 1: Get the batch

```
# Set batch parameters
B <- 100
# Create batch
batch <- make_batch(M = M, B = B)
head(batch)
```

```
##           x1         x2
## 1  0.6388979 -0.1525589
## 2  0.9270891  0.9562608
## 3  0.6810438  0.9932225
## 4  0.7319181  0.4028434
## 5 -0.2190539 -0.3704606
## 6  0.6918946 -0.7214430
```

Step 2: Evolve the batch

```
# Set evolution parameters
steps <- 20
# Evolve batch
evolved_batch <- evolve_batch(batch, steps)
# Add indexing to the batch
evolved_batch <- indexed_batch(evolved_batch, steps)
head(evolved_batch)
```

```
##          x1         x2 index_column
## 1 0.6388979 -0.1525589            1
## 2 0.3178572  0.1817860            1
## 3 0.2662833  0.2362923            1
## 4 0.2583318  0.2454985            1
## 5 0.2574428  0.2473722            1
## 6 0.2576977  0.2480596            1
```

```
tail(evolved_batch)
```

```
##             x1        x2 index_column
## 2095 0.8292696 0.7985288          100
## 2096 0.8308036 0.8000060          100
## 2097 0.8323405 0.8014859          100
## 2098 0.8338802 0.8029685          100
## 2099 0.8354228 0.8044539          100
## 2100 0.8369682 0.8059420          100
```

Step 3: Analyze the batch

```
# Plot the evolution arrays of the batch elements
batch_data <- evolved_batch
# 2d plot
batch_2d_plot(batch_data, "(Symmetric Stochastic Matrix)")
```