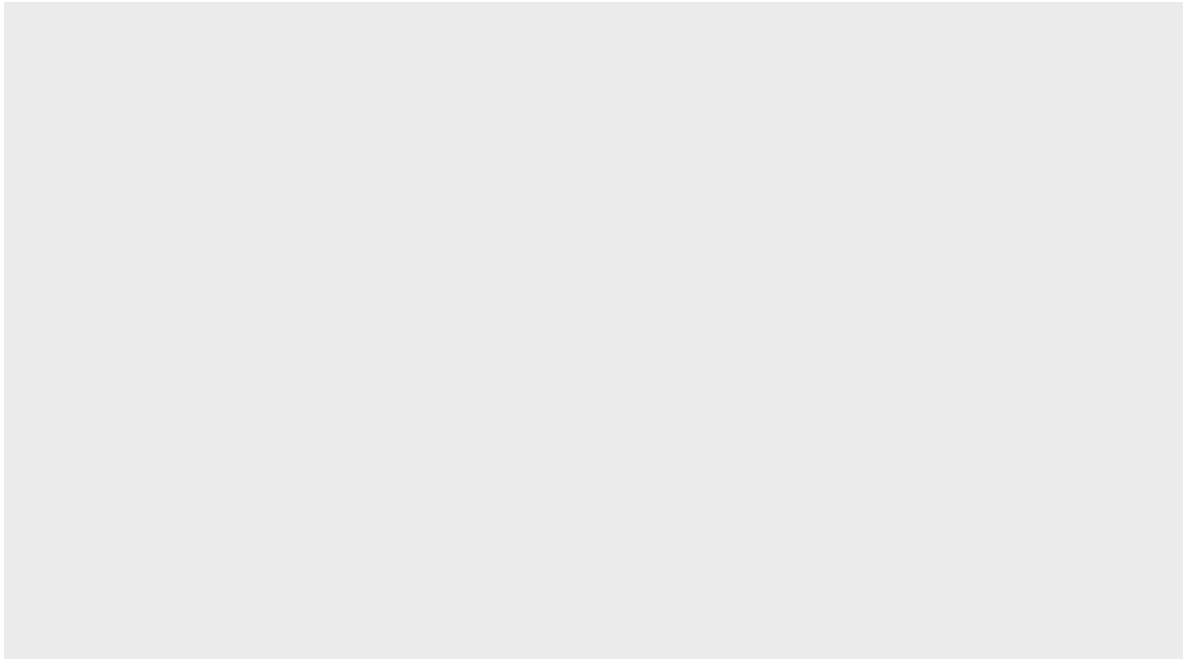# Mixing Times of Erdos-Renyi Walks

Ali Taqi

Erdos-Renyi Walk Mixing Times

```
##                  [,1] [,2]     [,3]      [,4]       [,5]      [,6]      [,7]
##  [1,] 0.000000000    0 0.000000 0.0000000 0.00000000 0.1889608 0.0000000
##  [2,] 0.000000000    0 0.000000 0.0000000 0.00000000 0.3265616 0.0000000
##  [3,] 0.000000000    0 0.000000 1.0000000 0.00000000 0.0000000 0.0000000
##  [4,] 0.000000000    0 0.000000 0.0000000 0.00000000 0.3566867 0.4117789
##  [5,] 0.000000000    0 0.000000 0.2654352 0.00000000 0.1910329 0.5435319
##  [6,] 0.000000000    0 0.000000 1.0000000 0.00000000 0.0000000 0.0000000
##  [7,] 0.000000000    0 0.000000 0.0000000 1.00000000 0.0000000 0.0000000
##  [8,] 0.003103129    0 0.000000 0.0000000 0.00000000 0.3336245 0.2007342
##  [9,] 0.000000000    0 0.366277 0.0000000 0.01896183 0.0000000 0.1384615
## [10,] 0.000000000    0 0.000000 0.0000000 0.57257499 0.0000000 0.0000000
##             [,8]      [,9]      [,10]
##  [1,] 0.4362033 0.3748359 0.00000000
##  [2,] 0.5788523 0.0000000 0.09458617
##  [3,] 0.0000000 0.0000000 0.00000000
##  [4,] 0.2315344 0.0000000 0.00000000
##  [5,] 0.0000000 0.0000000 0.00000000
##  [6,] 0.0000000 0.0000000 0.00000000
##  [7,] 0.0000000 0.0000000 0.00000000
##  [8,] 0.1699330 0.2926051 0.00000000
##  [9,] 0.0000000 0.0000000 0.47629968
## [10,] 0.4274250 0.0000000 0.00000000
```

Mixing Time Distribution for a Erdos−0.8 Matrix

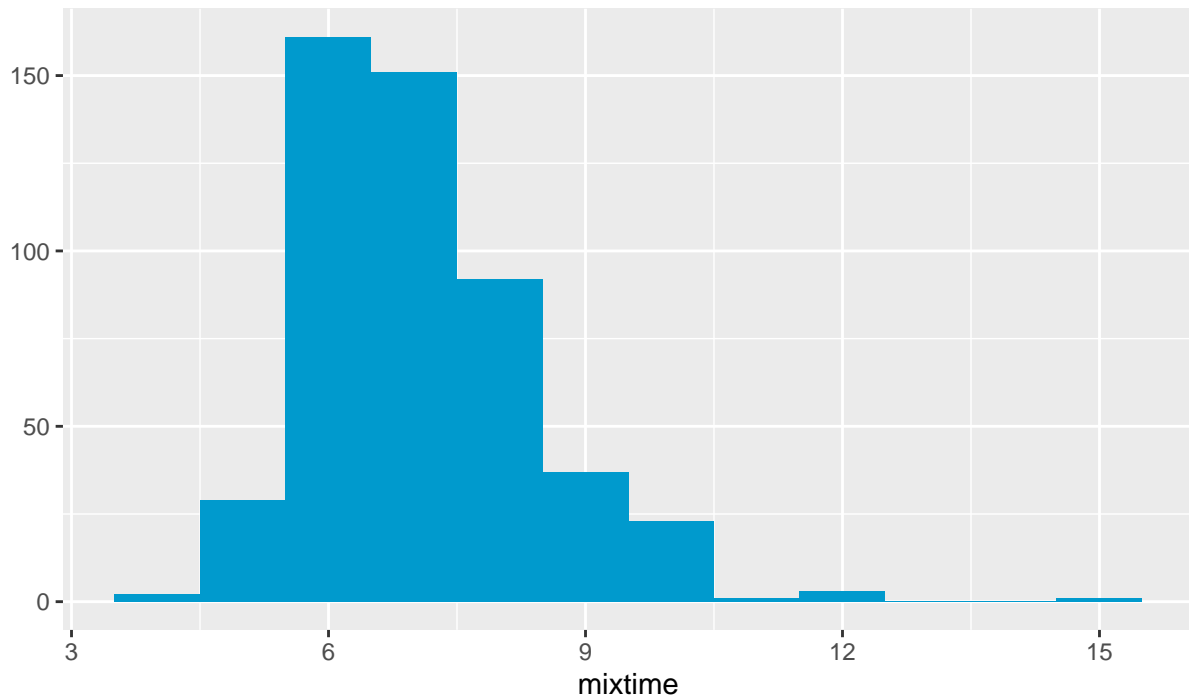mixtime

```
## [1] "This batch is 0% mixed."
```

```
##                [,1]        [,2]        [,3]       [,4]       [,5]        [,6]
##  [1,] 0.0000000 0.00000000 0.00000000 0.0000000 0.0000000 0.18896080
##  [2,] 0.0000000 0.00000000 0.00000000 0.0000000 0.0000000 0.18697336
##  [3,] 0.0000000 0.00000000 0.00000000 0.3516892 0.3480156 0.00000000
##  [4,] 0.1349424 0.00000000 0.14577105 0.0000000 0.3529259 0.15533816
##  [5,] 0.0000000 0.00000000 0.03443873 0.0000000 0.2870448 0.28364742
##  [6,] 0.0000000 0.00000000 0.49655054 0.0000000 0.0000000 0.07851302
##  [7,] 0.0000000 0.00000000 0.00000000 0.0000000 0.0000000 0.35945239
##  [8,] 0.1020842 0.29183445 0.17573479 0.1270924 0.0000000 0.17038258
##  [9,] 0.0000000 0.00000000 0.00000000 0.0000000 0.0000000 0.39295089
## [10,] 0.0000000 0.07244358 0.00000000 0.1994058 0.0000000 0.24154720
##               [,7]      [,8]      [,9]      [,10]
##  [1,] 0.000000000 0.4362033 0.3748359 0.00000000
##  [2,] 0.000000000 0.3314228 0.4274484 0.05415546
##  [3,] 0.166851581 0.1334436 0.0000000 0.00000000
##  [4,] 0.000000000 0.2110225 0.0000000 0.00000000
##  [5,] 0.034405533 0.0000000 0.3220857 0.03837782
##  [6,] 0.000000000 0.4249364 0.0000000 0.00000000
##  [7,] 0.000000000 0.0000000 0.6405476 0.00000000
##  [8,] 0.009967858 0.0000000 0.1229037 0.00000000
##  [9,] 0.332655463 0.0000000 0.2743937 0.00000000
## [10,] 0.233492187 0.2531112 0.0000000 0.00000000
```

Mixing Time Distribution for a Erdos−0.5 Matrix
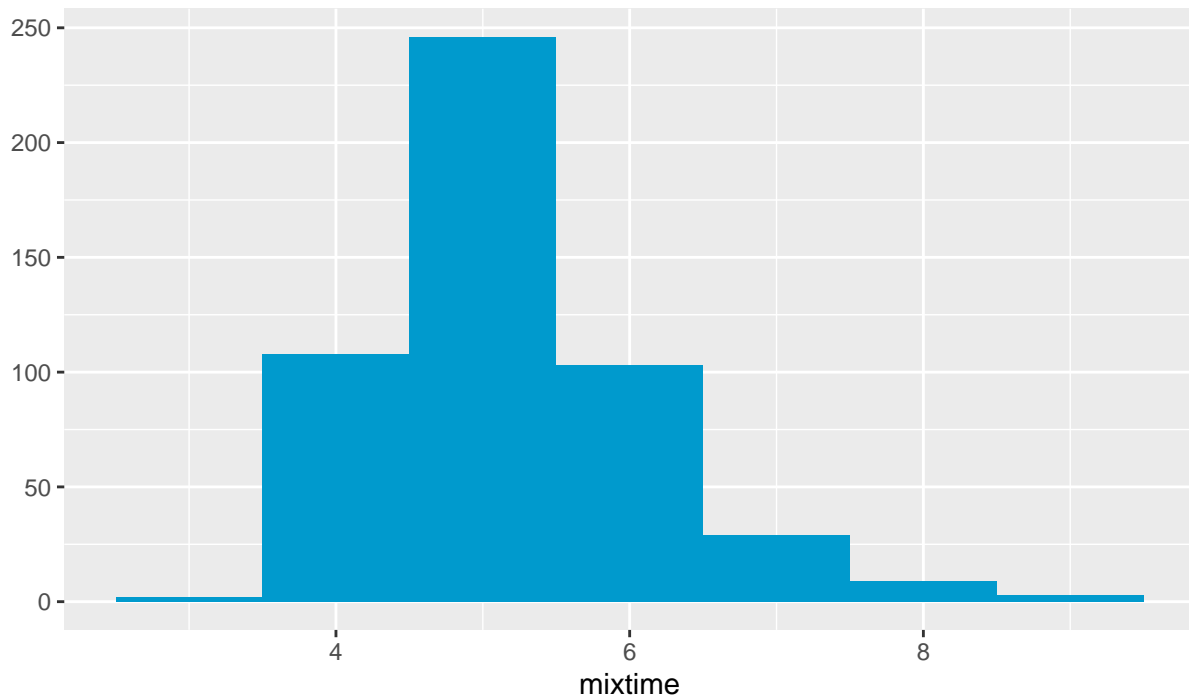


```
## [1] "This batch is 100% mixed."
```

```
##             [,1]       [,2]      [,3]       [,4]       [,5]       [,6]
##  [1,] 0.00000000 0.04952027 0.0736782 0.15777477 0.00000000 0.09406234
##  [2,] 0.18680447 0.03075587 0.1144129 0.13106957 0.20811706 0.13868107
##  [3,] 0.31725711 0.04019481 0.0000000 0.00000000 0.00000000 0.10826868
##  [4,] 0.00000000 0.00000000 0.0000000 0.12230029 0.09781263 0.24725041
##  [5,] 0.10457120 0.00000000 0.0000000 0.00000000 0.10267599 0.02753201
##  [6,] 0.15086802 0.04187865 0.1109065 0.17404232 0.15947535 0.01882944
##  [7,] 0.00000000 0.12592268 0.1333233 0.11522548 0.00000000 0.16331988
##  [8,] 0.20641071 0.00000000 0.2419434 0.08800560 0.05372912 0.00000000
##  [9,] 0.07852333 0.19023189 0.1133722 0.06576025 0.08105294 0.15851019
## [10,] 0.04015407 0.15330753 0.0000000 0.02092888 0.18696267 0.20949127
##             [,7]       [,8]       [,9]      [,10]
##  [1,] 0.00000000 0.21713658 0.18658867 0.22123917
##  [2,] 0.12949002 0.06066908 0.00000000 0.00000000
##  [3,] 0.12535429 0.11820290 0.29072221 0.00000000
##  [4,] 0.16410221 0.26863366 0.09990079 0.00000000
##  [5,] 0.24858858 0.10941474 0.25858064 0.14863683
##  [6,] 0.17010358 0.00000000 0.15508480 0.01881129
##  [7,] 0.12426478 0.09599895 0.03164902 0.21029592
##  [8,] 0.07798130 0.14402641 0.00000000 0.18790342
##  [9,] 0.00000000 0.07769243 0.21951768 0.01533905
## [10,] 0.02722682 0.06485909 0.18541674 0.11165293
```

Mixing Time Distribution for a Erdos−0.2 Matrix


```
## [1] "This batch is 100% mixed."
```