

# Week 10 Assignment

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## Playing with PageRank

### Bullet 1

Form the  $A$  Matrix.

```
A <- matrix(c(0, 0, .33, 0, 0, 0, .5, 0, .33, 0, 0, 0, .5, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, .5, 1, 0, 0, .33, .5, 0, 0, 0, 0, 0, .5, .5, 0), nrow=6, ncol=6)
```

A

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,] 0.00 0.50 0.5 0.0 0.00 0.0
## [2,] 0.00 0.00 0.0 0.0 0.00 0.0
## [3,] 0.33 0.33 0.0 0.0 0.33 0.0
## [4,] 0.00 0.00 0.0 0.0 0.50 0.5
## [5,] 0.00 0.00 0.0 0.5 0.00 0.5
## [6,] 0.00 0.00 0.0 1.0 0.00 0.0
```

Introduce Decay and form the  $B$  Matrix.

```
n <- 6 #chose 6 because there are 6 pages in the notes
B = 0.85*A+(0.15/n)
```

B

```
##      [,1] [,2] [,3] [,4] [,5] [,6]
## [1,] 0.0250 0.4500 0.450 0.025 0.0250 0.025
## [2,] 0.0250 0.0250 0.025 0.025 0.0250 0.025
## [3,] 0.3055 0.3055 0.025 0.025 0.3055 0.025
## [4,] 0.0250 0.0250 0.025 0.025 0.4500 0.450
## [5,] 0.0250 0.0250 0.025 0.450 0.0250 0.450
## [6,] 0.0250 0.0250 0.025 0.875 0.0250 0.025
```

### Bullet 2

Start uniform rank  $r$  and perform power iterations on  $B$  til convergence.

```
r <- matrix(c(.167, .167, .167, .167, .167, .167), nrow=6, ncol=1)
r
```

```
##      [,1]
## [1,] 0.167
## [2,] 0.167
## [3,] 0.167
## [4,] 0.167
## [5,] 0.167
## [6,] 0.167
```

```
r_solve1 = (B^10)%*%r
```

```
""
```