Week 14 - Social Network Graphs 2

James Quacinella

11/15/2015

Exercise 10.5.1 (section 10.5.5)

If, in Fig. 10.20 you start the walk from Picture 2, what will be the similarity to Picture 2 of the other two pictures? Which do you expect to be more similar to Picture 2?

Answer

Confirm code works with getting same answer from book's example:

```
n_iters <- 100;
M <- matrix(c(0, 0, 0, 4/15, 2/5,
              0, 0, 0, 4/15, 0,
              0, 0, 0, 4/15, 2/5,
              2/5, 4/5, 2/5, 0, 0,
              2/5, 0, 2/5, 0, 0), ncol=5, byrow = TRUE);
beta <- 0.8;
en <- c(1,0,0,0,0);

Mnew <- M + matrix(rep((1-beta)*en, 5), ncol=5);

# Iterate 100 times
vn <- en;
for (i in 1:n_iters) {
  vn <- Mnew %*% vn;
}

# Print final results, which matcth the book
vn
```

```
##           [,1]
## [1,] 0.34461028
## [2,] 0.06633499
## [3,] 0.14461028
## [4,] 0.24875622
## [5,] 0.19568823
```

Lets do the same for N = 1, which is picture 2:

```
n_iters <- 100;
M <- matrix(c(0, 0, 0, 4/15, 2/5,
              0, 0, 0, 4/15, 0,
              0, 0, 0, 4/15, 2/5,
              2/5, 4/5, 2/5, 0, 0,
              2/5, 0, 2/5, 0, 0), ncol=5, byrow = TRUE);
beta <- 0.8;
```

```r
en <- c(0,1,0,0,0);

Mnew <- M + matrix(rep((1-beta)*en, 5), ncol=5);

# Iterate 100 times
vn <- en;
for (i in 1:n_iters) {
  vn <- Mnew %*% vn;
}

# Print final results, which matcth the book
vn
```

```
##           [,1]
## [1,] 0.1326700
## [2,] 0.2902156
## [3,] 0.1326700
## [4,] 0.3383085
## [5,] 0.1061360
```

Notice, that the similarity to Picture 1 and Picture 3 is the same; since its symmetrical we should not expect anything different.

Use R for 10.7.1 (section 10.7.6)

Answer