MAT1002 Lab Exp. No.2

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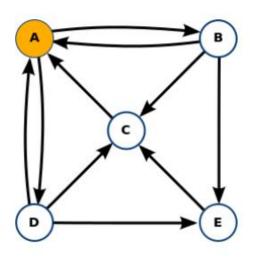
Registration No.: 20BCD7138

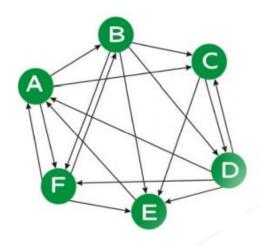
Aim : Understanding the mathematics behind the most successful search engine i.e. Google by using a simplified version of the Random Surfer Algorithm.

Problem using MATLAB: Find most important webpage

Exercise Problems

▶ Write the transition matrix for the webs shown below and arrange the pages in the order of their importance.





Problem No.1

 $A = [0 \ 1/3 \ 1 \ 1/3 \ 0; 1/2 \ 0 \ 0 \ 0; 0 \ 1/3 \ 0 \ 1/3 \ 1; 1/2 \ 0 \ 0 \ 0; 0 \ 1/3 \ 0 \ 1/3 \ 0]$

A =

0	0.3333	1.0000	0.3333	0
0.5000	0	0	0	0
0	0.3333	0	0.3333	1.0000
0.5000	0	0	0	0
0	0.3333	0	0.3333	0

```
>> [V,D] = eig(A)
V =
 -0.6975 + 0.0000i   0.6386 + 0.0000i   -0.0175 - 0.5057i   -0.0175 + 0.5057i   0.0000 + 0.0000i
 -0.3487 + 0.0000i -0.4447 + 0.0000i -0.3604 + 0.0894i -0.3604 - 0.0894i 0.7071 + 0.0000i
 -0.4650 + 0.0000i -0.1621 + 0.0000i 0.5798 + 0.0000i 0.5798 + 0.0000i 0.0000 + 0.0000i
 -0.3487 + 0.0000i -0.4447 + 0.0000i -0.3604 + 0.0894i -0.3604 - 0.0894i -0.7071 + 0.0000i
 -0.2325 + 0.0000i   0.4128 + 0.0000i   0.1585 + 0.3269i   0.1585 - 0.3269i
                                                                          0.0000 + 0.0000i
D =
  1.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
                                                                            0.0000 + 0.0000i
  0.0000 + 0.0000i -0.7181 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
                                                                           0.0000 + 0.0000i
  0.0000 + 0.0000i 0.0000 + 0.0000i -0.1410 + 0.6666i 0.0000 + 0.0000i
                                                                           0.0000 + 0.0000i
  0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i -0.1410 - 0.6666i
                                                                           0.0000 + 0.0000i
  0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
                                                                            0.0000 + 0.0000i
      u=V(:,1)
      u =
         -0.6975
         -0.3487
         -0.4650
         -0.3487
         -0.2325
      u1=u/sum(u)
      u1 =
          0.3333
          0.1667
          0.2222
          0.1667
```

0.1111

```
u2=u/max(u)

u2 =

3.0000
1.5000
2.0000
1.5000
1.0000

u3=u/norm(u,2)

u3 =

-0.6975
-0.3487
-0.4650
-0.3487
-0.2325
```

Problem No.2

>> A=[0 0 0 1/3 1 1/3;1/3 0 0 0 0 1/3;1/3 1/3 0 0 0 0;0 0 1/2 0 0 0;0 1/3 1/2 1/3 0 1/2;1/3 1/3 0 1/3 0 0]

A =

0.3333	1.0000	0.3333	0	0	0
0.3333	0	0	0	0	0.3333
0	0	0	0	0.3333	0.3333
0	0	0	0.5000	0	0
0.5000	0	0.3333	0.5000	0.3333	0
0	0	0.3333	0	0.3333	0.3333

```
0.6386 + 0.0000i -0.7176 + 0.0000i -0.7176 + 0.0000i 0.2892 + 0.0000i 0.2253 - 0.0061i 0.2253 + 0.0061i
  0.3250 + 0.0000i 0.2039 + 0.2380i 0.2039 - 0.2380i -0.6431 + 0.0000i -0.4915 - 0.0595i -0.4915 + 0.0595i
  0.3129 + 0.0000i 0.2057 + 0.1855i 0.2057 - 0.1855i 0.2771 + 0.0000i -0.0399 + 0.3290i -0.0399 - 0.3290i
  0.1524 + 0.0000i 0.0660 - 0.1922i 0.0660 + 0.1922i -0.3255 + 0.0000i 0.6007 + 0.0000i 0.6007 + 0.0000i
  D =
  1.0265 + 0.0000i
                 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
  0.0000 + 0.0000i -0.2672 + 0.6267i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
                                              0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i
  0.0000 + 0.0000i
               0.0000 + 0.0000i -0.2672 - 0.6267i
  0.0000 + 0.0000i 0.0000 + 0.0000i 0.0000 + 0.0000i -0.4257 + 0.0000i
                                                             0.0000 + 0.0000i 0.0000 + 0.0000i
  0.0000 + 0.0000i 0.0000 + 0.0000i
                                              0.0000 + 0.0000i -0.0332 + 0.2738i 0.0000 + 0.0000i
                                0.0000 + 0.0000i
  0.0000 + 0.0000i
                 0.0000 + 0.0000i
                                0.0000 + 0.0000i
                                              0.0000 + 0.0000i
                                                             0.0000 + 0.0000i -0.0332 - 0.2738i
          >> u=V(:,1)
          u =
              0.6386
              0.3250
              0.3129
              0.1524
              0.4839
              0.3624
          >> u1=u/sum(u)
          u1 =
              0.2807
              0.1429
              0.1375
              0.0670
```

>> [V,D]=eig(A)

0.21270.1593

>> u2=u/max(u) u2 = 1.0000 0.5090 0.4900 0.2387 0.7578 0.5675 >> u3=u/norm(u,2) u3 = 0.6386 0.3250 0.3129

0.15240.48390.3624