
Table of Contents

Part 1	1
Part a)	1
Part b)	2
Part c)	3
Part 2	10

Part 1

```
v1 = [1;0;-1]
v2 = [2;2;0]
v3 = [1;1;2]
eignvalues = [1 0 0;0 .5 0;0 0 0.5]
```

```
v1 =
```

```
    1
    0
   -1
```

```
v2 =
```

```
    2
    2
    0
```

```
v3 =
```

```
    1
    1
    2
```

```
eignvalues =
```

```
    1.0000         0         0
         0    0.5000         0
         0         0    0.5000
```

Part a)

```
x = [7;5;4]
m1 = [v1 v2 v3 x]
rref(m1)
c = [2;1;3]
```

```
%C is the answer from the rref of m1
```

```
x =
```

```
7  
5  
4
```

```
m1 =
```

```
1    2    1    7  
0    2    1    5  
-1   0    2    4
```

```
ans =
```

```
1    0    0    2  
0    1    0    1  
0    0    1    3
```

```
c =
```

```
2  
1  
3
```

Part b)

```
p = [v1 v2 v3]  
d = eignvalues  
for k = [1 2 3 4 5]  
    (p * d^k * inv(p))*x  
end
```

```
p =
```

```
1    2    1  
0    2    1  
-1   0    2
```

```
d =
```

```
1.0000    0    0  
0    0.5000    0  
0    0    0.5000
```

`ans =`

`4.5000`
`2.5000`
`1.0000`

`ans =`

`3.2500`
`1.2500`
`-0.5000`

`ans =`

`2.6250`
`0.6250`
`-1.2500`

`ans =`

`2.3125`
`0.3125`
`-1.6250`

`ans =`

`2.1563`
`0.1563`
`-1.8125`

Part c)

```
for k = [1:50]
    (p * d^k * inv(p)) * x
end
%If the eigenvalues are less than one, they converge to zero, thus v2
and
%v3 become irrelevant. V1's eigenvalue is 1, so it converges to 1,
thus it
%remains as k goes to infinity. The answer then become v1 multiplied
by the
%first value in c, because that was the linear combination to get v1
to x.
```

`ans =`

`4.5000`

2.5000
1.0000

ans =

3.2500
1.2500
-0.5000

ans =

2.6250
0.6250
-1.2500

ans =

2.3125
0.3125
-1.6250

ans =

2.1563
0.1563
-1.8125

ans =

2.0781
0.0781
-1.9063

ans =

2.0391
0.0391
-1.9531

ans =

2.0195
0.0195
-1.9766

ans =

2.0098
0.0098
-1.9883

ans =

2.0049
0.0049
-1.9941

ans =

2.0024
0.0024
-1.9971

ans =

2.0012
0.0012
-1.9985

ans =

2.0006
0.0006
-1.9993

ans =

2.0003
0.0003
-1.9996

ans =

2.0002
0.0002
-1.9998

ans =

2.0001
0.0001
-1.9999

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

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-2.0000

ans =

2.0000
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ans =

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ans =

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ans =

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0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

ans =

2.0000
0.0000
-2.0000

```
ans =

    2.0000
    0.0000
   -2.0000
```

```
ans =

    2.0000
    0.0000
   -2.0000
```

```
ans =

    2.0000
    0.0000
   -2.0000
```

Part 2

```
g1 = [0 0 1 0 1/5;1/3 0 0 1/2 1/5;1/3 0 0 1/2 1/5; 1/3 1/2 0 0 1/5;0
      1/2 0 0 1/5] * 0.85
p1 = [1/5 1/5 1/5 1/5 1/5;1/5 1/5 1/5 1/5 1/5;1/5 1/5 1/5 1/5;1/5
      1/5 1/5 1/5;1/5 1/5 1/5 1/5] * .15
G1 = g1 + p1
g2 = [1/6 1/2 1/4 0 0 1/6;1/6 0 1/4 0 0 1/6;1/6 1/2 0 1/2 0 1/6;1/6 0
      1/4 0 0 1/6;1/6 0 1/4 1/2 0 1/6;1/6 0 0 0 1 1/6] * 0.85
p2 = [1/6 1/6 1/6 1/6 1/6 1/6;1/6 1/6 1/6 1/6 1/6 1/6;1/6 1/6 1/6 1/6
      1/6 1/6;1/6 1/6 1/6 1/6 1/6 1/6;1/6 1/6 1/6 1/6 1/6;1/6 1/6 1/6
      1/6 1/6 1/6] * 0.15
G2 = g2 + p2
%Both entries of G1 and G2 (my google matrices) are the values of the
%probability matrix, meaning that at that point, the user will then
click
%on a random website or look something up. The meaning of row three is
the
%probability that the user will either stay on that page once they are
%there, and the probability of them clicking on another page.
G1k = G1^15
G2k = G2^14
%Both entries of G1 and G2 (my google matrices as k goes to infinity)
are the values from the
%probability matrix, meaning that at that point, the user will then
click
%on a random website or look something up. The meaning of row three is
the
%probability that the user will either stay on that page once they are
%there, and the probability of them clicking on another page.
```

$g1 =$

0	0	0.8500	0	0.1700
0.2833	0	0	0.4250	0.1700
0.2833	0	0	0.4250	0.1700
0.2833	0.4250	0	0	0.1700
0	0.4250	0	0	0.1700

$p1 =$

0.0300	0.0300	0.0300	0.0300	0.0300
0.0300	0.0300	0.0300	0.0300	0.0300
0.0300	0.0300	0.0300	0.0300	0.0300
0.0300	0.0300	0.0300	0.0300	0.0300
0.0300	0.0300	0.0300	0.0300	0.0300

$G1 =$

0.0300	0.0300	0.8800	0.0300	0.2000
0.3133	0.0300	0.0300	0.4550	0.2000
0.3133	0.0300	0.0300	0.4550	0.2000
0.3133	0.4550	0.0300	0.0300	0.2000
0.0300	0.4550	0.0300	0.0300	0.2000

$g2 =$

0.1417	0.4250	0.2125	0	0	0.1417
0.1417	0	0.2125	0	0	0.1417
0.1417	0.4250	0	0.4250	0	0.1417
0.1417	0	0.2125	0	0	0.1417
0.1417	0	0.2125	0.4250	0	0.1417
0.1417	0	0	0	0.8500	0.1417

$p2 =$

0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
0.0250	0.0250	0.0250	0.0250	0.0250	0.0250
0.0250	0.0250	0.0250	0.0250	0.0250	0.0250

$G2 =$

0.1667	0.4500	0.2375	0.0250	0.0250	0.1667
0.1667	0.0250	0.2375	0.0250	0.0250	0.1667
0.1667	0.4500	0.0250	0.4500	0.0250	0.1667
0.1667	0.0250	0.2375	0.0250	0.0250	0.1667

0.1667	0.0250	0.2375	0.4500	0.0250	0.1667
0.1667	0.0250	0.0250	0.0250	0.8750	0.1667

$G1k =$

0.2315	0.2315	0.2315	0.2315	0.2315
0.2085	0.2085	0.2085	0.2085	0.2085
0.2085	0.2085	0.2085	0.2085	0.2085
0.2085	0.2085	0.2085	0.2085	0.2085
0.1429	0.1429	0.1429	0.1429	0.1429

$G2k =$

0.1725	0.1725	0.1725	0.1725	0.1725	0.1725
0.1210	0.1210	0.1210	0.1210	0.1210	0.1210
0.1847	0.1847	0.1847	0.1847	0.1847	0.1847
0.1210	0.1210	0.1210	0.1210	0.1210	0.1210
0.1725	0.1725	0.1725	0.1725	0.1725	0.1725
0.2284	0.2284	0.2284	0.2284	0.2284	0.2284

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