

Unit 12 - Week 8 : Link Analysis (Continued)

Course outline

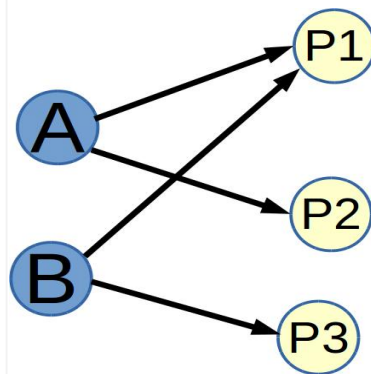
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- Lecture 101 : Introduction to Hubs and Authorities (A Story)

Week 8 - Assignment 1

1) Observe the graph shown in the following figure. According to the principle of repeated improvement, which of the following is correct?

1 point



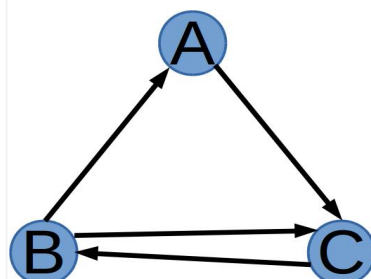
- ☐ $A = P1 \times P2, B = P1 \times P3, P1 = A + B, P2 = A, P3 = B$
☐ $A = P1 + P2, B = P1 + P3, P1 = A \times B, P2 = A, P3 = B$
☐ $A = P1 + P2, B = P1 + P3, P1 = A + B, P2 = A, P3 = B$
☐ $A = P1 + P2, B = P1 + P3, P1 = A \times B, P2 = 0, P3 = 0$

Accepted Answers:

$$A = P1 + P2, B = P1 + P3, P1 = A + B, P2 = A, P3 = B$$

2) In the graph shown in the figure below, assume that the current pagerank values of A, B and C are 0.2, 0.4 and 0.4 respectively. What will be their pagerank values after one iteration?

1 point



- Lecture 102: Principle of Repeated Improvement (A story)
- Lecture 103: Principle of Repeated Improvement (An example)
- Lecture 104 : Hubs and Authorities
- Lecture 105 : PageRank Revisited - An example
- Lecture 106: PageRank Revisited - Convergence in the Example
- Lecture 107 : PageRank Revisited - Conservation and Convergence
- Lecture 108: PageRank, conservation and convergence - Another example
- Lecture 109 : Matrix Multiplication (Pre-requisite 1)
- Lecture 110: Convergence in Repeated Matrix Multiplication (Pre-requisite 1)
- Lecture 111 : Addition of Two Vectors (Pre-requisite 2)
- Lecture 112 : Convergence in Repeated Matrix Multiplication- The Details
- Lecture 113 : PageRank as a Matrix Operation
- Lecture 114 : PageRank Explained

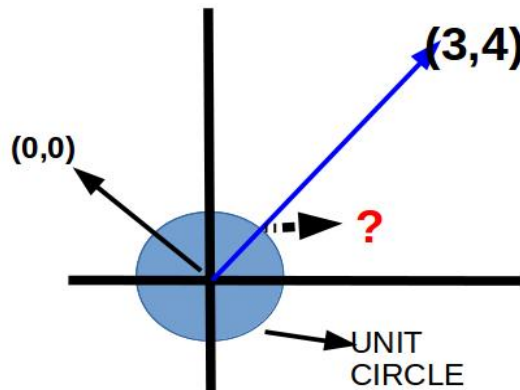
○ Quiz : Week 8 - Assignment 1

- ☐ A : 0.4, B : 0.4, C : 0.4
- ☐ A : 0.2, B : 0.4, C : 0.4
- ☐ A : 0.4, B : 0.2, C : 0.4
- ☐ A : 0.4, B : 0.4, C : 0.2

Accepted Answers:

A : 0.2, B : 0.4, C : 0.4

3) Given a vector (3, 4) in the XY plane, what will this vector become after being pulled to the unit circle as shown in the figure below? **1 point**



- ☐ 4/5, 3/5
- ☐ 4/25, 3/25
- ☐ 3/5, 4/5
- ☐ 3/25, 4/25

Accepted Answers:

3/5, 4/5

4) When we normalise a vector by pulling it on the unit circle

1 point

- ☐ Its magnitude as well as the direction change.
- ☐ Its magnitude remains the same but the direction changes.
- ☐ Its magnitude might change but the direction remains the same.
- ☐ Both the magnitude as well as the direction remains the same.

Accepted Answers:

Its magnitude might change but the direction remains the same.

5) When we add two vectors in the XY plane, where one vector has a very high magnitude as compared to the other, then the resultant vector is closer towards (in terms of direction) to

1 point

- ☐ the bigger vector
- ☐ the smaller vector
- ☐ origin
- ☐ none of the above

Accepted Answers:

the bigger vector

6) Given two linearly independent vector v1 and v2, which of the following is true?

1 point

- ☐ Feedback for week 8
- ☐ Week 8 Assignment answers

Week -9 : Power Laws and Rich-Get-Richer Phenomena

Week 10 - Power law (contd..) and Epidemics

Week 11- Small World Phenomenon

Week 12- Pseudocore (How to go viral on web?)

- ☐ Any other vector can be written as the linear combination of v_1 and v_2 . i.e. $z = \alpha v_1 + \beta v_2$.
- ☐ Any other vector can be written as sum of v_1 and v_2 . i.e. $z = v_1 + v_2$.
- ☐ Any other vector can be written as difference of v_1 and v_2 . i.e. $z = |v_1 - v_2|$.
- ☐ Any other vector can be written as multiplication of v_1 and v_2 . i.e. $z = v_1 \times v_2$.

Accepted Answers:

Any other vector can be written as the linear combination of v_1 and v_2 . i.e. $z = \alpha v_1 + \beta v_2$.

7) When we repeatedly apply a matrix A to a vector v , k times; we get $A^k v$. For a very large value of k **1 point**

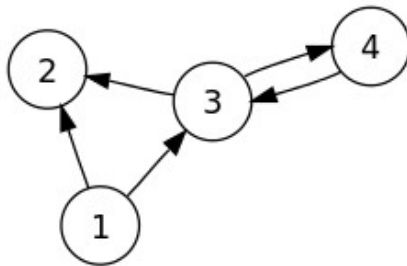
- ☐ $A^k v$ converges in the direction of the eigen vector corresponding to the bigger eigen value of the matrix A .
- ☐ $A^k v$ converges in the direction of the eigen vector corresponding to the smaller eigen value of the matrix A .
- ☐ $A^k v$ converges to the origin.
- ☐ None of the above.

Accepted Answers:

$A^k v$ converges in the direction of the eigen vector corresponding to the bigger eigen value of the matrix A

8) Given the graph as shown in the figure below.

1 point



While calculating the pagerank using matrix multiplication method on this graph, how does the first matrix operation look like?

- ☐
$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 1 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$
- ☐
$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 0 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$
- ☐
$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$
- ☐
$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$

Accepted Answers:

$$\begin{pmatrix} 0 & 0 & 0 & 0 \\ 1/2 & 1 & 1/2 & 0 \\ 1/2 & 0 & 0 & 1 \\ 0 & 0 & 1/2 & 0 \end{pmatrix} \begin{pmatrix} 1/4 \\ 1/4 \\ 1/4 \\ 1/4 \end{pmatrix}$$

9) In a Markov matrix

1 point

- ☐ The sum of elements in every row is 1.
☐ The sum of elements in every column is 1.
☐ The sum of diagonal elements is 1.
☐ None of the above.

Accepted Answers:*The sum of elements in every column is 1.*

10) Highest eigen value of a Markov matrix is

1 point

- ☐ -1
☐ 0
☐ 1
☐ None of the above.

Accepted Answers:**1**

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