Ranking with PageRank algorithm

Problem

	Species	A	B	C	D	E	F	G	H
	100g/ha	10	0	0	0	20	0	0	0
	500g/ha	20	40	30	0	80	10	20	0
Score at each application rate	1000g/ha	30	90	75	10	100	50	40	10
	ED50	1500	600	750	>1000	280	1000	1200	>1000

Ranking with PageRank

In the case where we don't have a "nice" graph (not irreductible)
we have to introduce a dumping factor in order to keep on
navigating in the graph. So we introduce a matrix T (teleportation)
the constant matrix Tij=1 such that the new transition matrix is:

Q=d*A+(1-d)*T

With d dumping factor close to 1

The eigenvalue problem is:

xQ=x

That we can solve by a power method algorithm.

We can view the importance of a page as the probability than
a surfer visits this page by clicking randomly on hyperlinks.
If we consider at first that the pages have the same probability
to be taken as starting point so x=[1/4 ¼ ¼ ¼]
The probability than the page 1 will be visited afer one step is
Ax and k steps A^k x. If A is irreductible (there is a path from
every edges i to j)

We have an eigen-value problem

$$\pi A = \pi$$
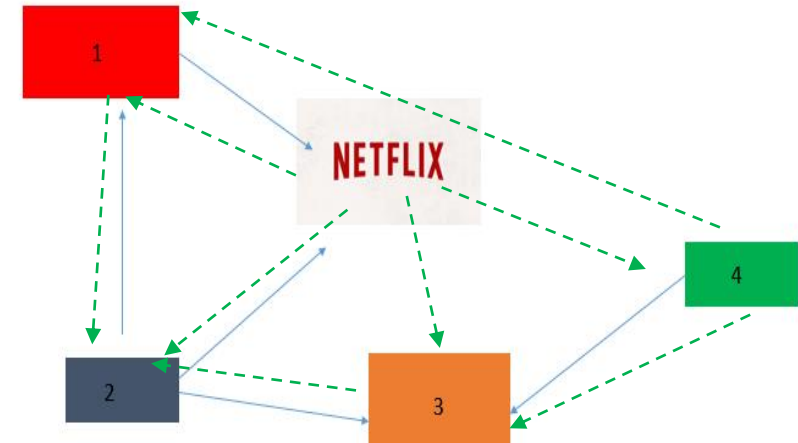
$$A = \begin{bmatrix} 0 & 0 & 1 & \frac{1}{2} \\ \frac{1}{3} & 0 & 0 & 0 \\ \frac{1}{3} & \frac{1}{2} & 0 & \frac{1}{2} \\ \frac{1}{3} & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

What to do next?

-We need to find the graph of a data and try different weighted functions that can fit: we can approach it by ranking page methods in sports: create a link between from   A to B if the teams A beats the team B and weights by the difference of goals.