

# The Importance Vector for a Web

How should we define the **importance** of a page in a web? Google proposes three ideas:

- more incoming links  $\implies$  more importance
- incoming link from an important page  $\implies$  more importance
- importance must not spread itself too thin; it must be shared among all outgoing links

These three ideas are captured by the formula

$$x_i = \sum_{j \rightarrow i} \frac{1}{n_j} x_j = \sum_{i=1}^n a_{ij} x_j$$

(do you see why?). If  $x$  is the **importance vector** of the web (the vector with entries  $x_i$ ), then the above formula is just the equation

$$x = Ax$$

that is,  $x$  is an eigenvector of  $A$  corresponding to eigenvalue 1.