

# PageRank: Random Surfer Model

- $$P(n) = \alpha \frac{1}{|V|} + (1 - \alpha) \sum_{m \in L(n)} \frac{P(m)}{C(m)}$$
- $$P(n) = \alpha \frac{1}{|V|} + (1 - \alpha) \left( \frac{\delta}{|V|} + \sum_{m \in L(n)} \frac{P(m)}{C(m)} \right)$$
- The variables in the formula have the following meaning:
  - $|V|$  is the number of pages (nodes) in the Web graph considered.
  - $\alpha$  is the probability of the surfer making a random jump, therefore  $1-\alpha$  is the probability of following a link.
  - $L(n)$  is the set of all pages in the graph linking to  $n$ .
  - $P(m)$  is the PageRank of another page  $m$ .
  - $C(m)$  is the out-degree of page  $m$ , i.e., the number of links on that page.
  - $\delta$  is the total PageRank mass of dangling nodes.
- Recursive definition