

# The Stationary Distribution of a Markov chain

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# Introduction

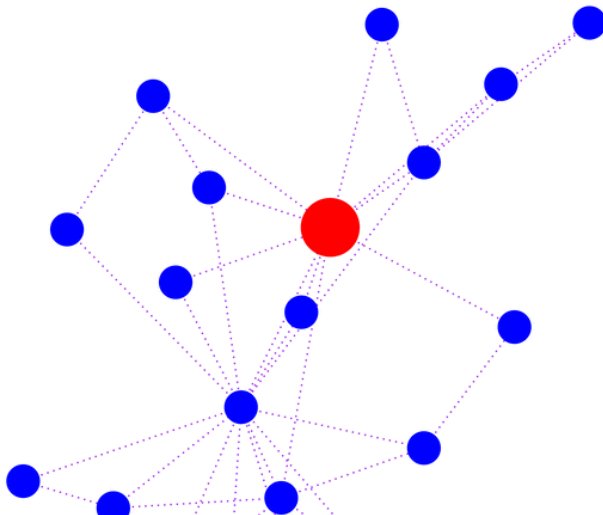
This report was concerned with building on the page rank approach of measuring node centrality in a graph, by investigating the *Power Walk* method.

This required researching:

- ▶ The Mathematics of *PageRank* and relationship to Markov Chains
- ▶ How ***R*** implements:
  - ▶ Packages
  - ▶ Sparse Matrices
- ▶ Different algorithms to simulate graph structures.

## What is the *PageRank*

*PageRank* measures node centrality by recording the frequency that nodes are traversed during a random walk, i.e. walk around a graph, for a long time and record where you went:

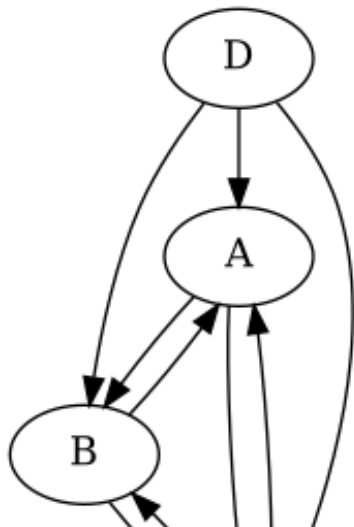


# Mathematics of Page Rank

The Stationary Distribution of a Probability Transition Matrix

Adjacency Matrix

Take some graph:



# Sparse Matrices

# Implementing the Models

Implementing the Random Surfer

Implementing the Power Walk

# Creating a Package



# Types of Graphs

## Erdos Renyi

