Data Sci Discover Project

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Question

Can we determine the second eigenvalue from the method parameters? For PageRank, the second eigenvalue is equal to the smoothing parameter α

> Yes. An open question for the Power Walk method is, can we determine the second eigenvalue from the method parameters? For PageRank, the second eigenvalue is equal to the smoothing parameter α. The second eigenvalue determines how long the algorithm takes to converge and how stable the solution is. To begin, implement the method for computing PageRank and then the Power Walk. It can all be done using sparse matrices, so it only requires a fraction of the memory and is each iteration is quick.

Working

Take the exemplar Graph from Figure 1:

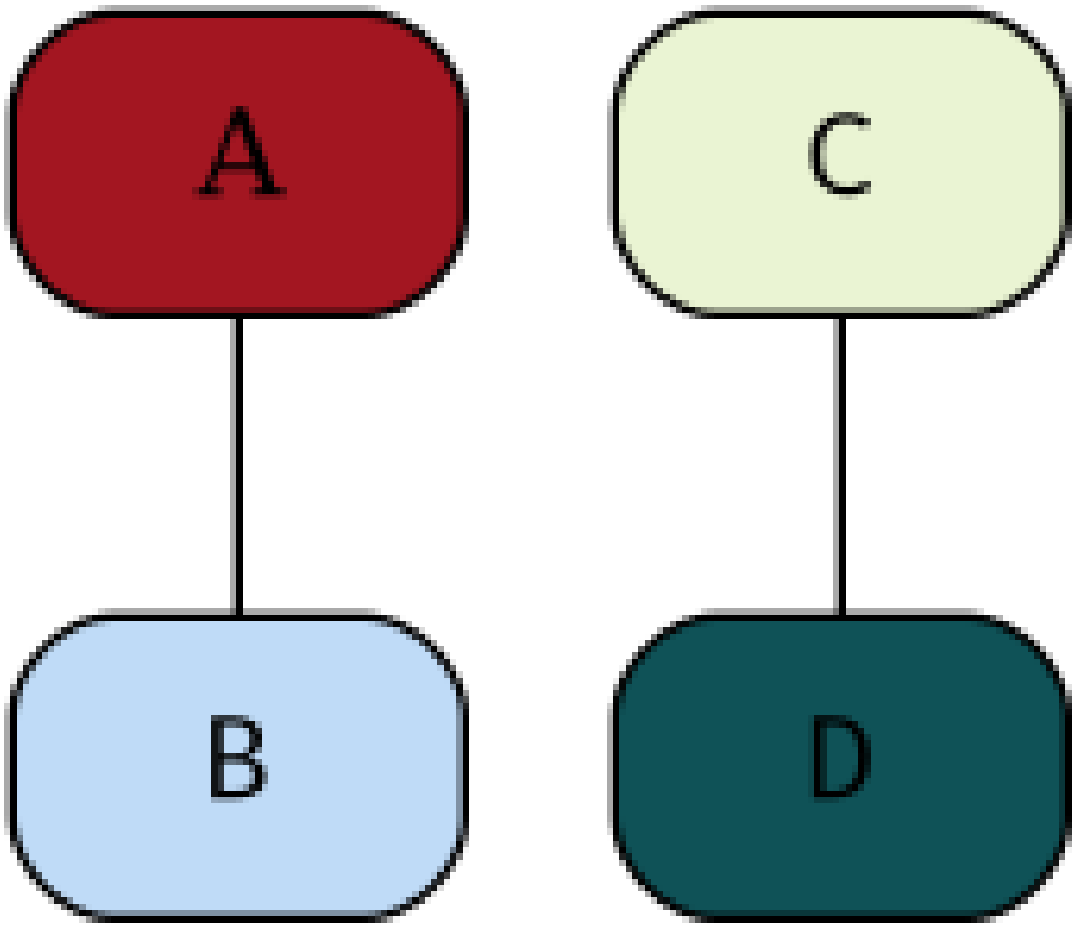
```
# #+begin_src javascript :exports code
@startdot
strict digraph graphName {
concentrate=true
fillcolor=green
color=blue
style="filled, rounded"
 A [shape=box, fillcolor="#a31621", style="rounded, filled"]

 edge [
    arrowhead="none"
  ];

 node[
    fontname="Fira Code",
    shape="square",
    fixedsize=false,
    style=rounded
  ];


# A -> B [dir="both"]
A -> B
B [shape=box, fillcolor="#bfdbf7", style="rounded, filled"]
B -> A
C [shape=box, fillcolor="#eaf4d3", style="rounded, filled"]
C -> D
D [shape=box, fillcolor="#0f5257", style="rounded, filled"]
D -> C
}
@enddot
```

Listing 1: Code to Generate DOT Graph



$$\Gamma = I - nD_B^{-1}$$

Where we have the following: