Linear Algebra

PageRank Assignment (*20 points*)

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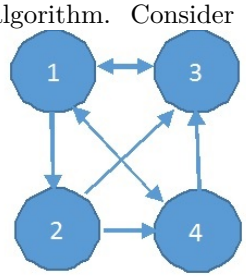
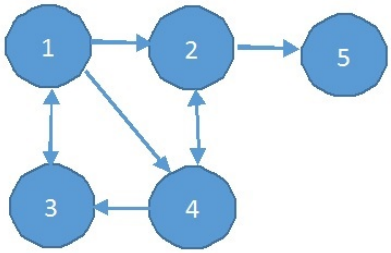
Create a reproducible document containing your analysis for the following problem and submit your R markdown and html files on Canvas.

In this problem we'll explore one of the applications of eigenvalues and eigenvectors, google PageRank algorithm. Consider a set of webpages hyperlinked by the given directed graphs in each diagrams

(a)



(b)



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For each diagram:

a. Determine the corresponding transition matrix A.

b. Determine the google matrix G.

c. Does either graph have a dangling node? If so which one(s)?

d. Does either graph have a disconnected node? If so which one(s)?

e. Compute the PageRank of each page in the set. (Recall that the PageRank vector for a web graph with transition matrix A, and damping factor p, is the unique probabilistic eigenvector of the matrix G, corresponding to the eigenvalue 1.)