

Learning materials for L15

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Dear Students, for the class tomorrow (May 30, 2022), you are required to learn by yourselves, following recorded videos and related learning materials. Please **make sure** you finish them before the class on 6 June, 2022.

1. **Lab 11.** I recorded a [video](#) on Lab 11 (Gibbs) and put the [R file](#) on our course website. Please revise your Lab 11 solutions accordingly.
2. **L15-SVD.** I recorded a [video](#) on SVD. Please follow the video carefully and solve the PageRank Problem below. You will find [this document](#) helpful.
3. **Applications of SVD.** Please review the literature on SVD and write a summary of the applications of SVD (less than one page). I think this would be very useful for your final report.

PageRank Problem

The Internet can be seen as a large graph, where the Web pages themselves represent nodes, and their links (direct connection to other Web pages) can be seen as the edges of the graph. The links (edges) are directed; i.e. a link only points one way, although there is nothing stopping the other page from pointing back.

The PageRank algorithm is at the heart of the Google search engine. The underlying idea for the PageRank algorithm is the following: a page is important, if other important pages link to it. This idea can be seen as a way of calculating the importance of pages by voting for them.

The directed graph in Figure 1 exemplifies a very small isolated part of the Web with only five Webpages. Please define the connectivity (adjacency) matrix (link structure) for this graph and find the page ranking (importance) of each webpage.

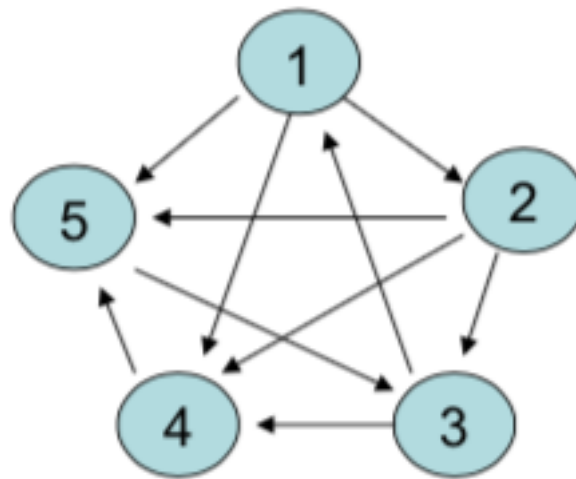


Figure 1: A directed graph of five webpages