Non-backtracking centrality, linegraphs and beyond

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Abstract:

Given a network the task of finding important (central) nodes or edges is a typical problem. Among the centrality measures proposed eigenvector centrality occupies a well recognised position. As was recently observed in [1] this definition has a problem of introducing some undesirable feedback. In colloquial language, I am important, then my neighbours gain importance, therefore I become more important, then.....

Non-backtracking centrality has been proposed in [1] as an attemtp to minimize this undesirable effect. This new definition turns out to be built upon the concept of linegraph of a directed graph considered by the authors in [2]-[4]. In this talk we suggest how this non-backtracking centrality can be viewed as a particular case of a more general definition, the *almost non-backtracking centrality* introduced by the authors.

[1] T. Martin, X. Zhang, M.E,J, Newman, "Localization and Centrality in networks" PRE 90 (2014)

[2] R. Criado, J. Flores, A. García del Amo, M. Romance
" Analytical relationships between metric and centrality measures of a network and its dual"
JCAM 235 (2011)

[3] R. Criado, J. Flores, A. Garcia del Amo, M. Romance
"Structural properties and interplays between directed and undirected line-graphs "
Networks and Heterogeneous media 7 (3) (2012)
Editorial (si libro):

[4] R. Criado, J. Flores, A. Garcia del Amo, M. Romance
"Centralities of a network and its line graph: An analytical comparison by means of their irregularity”
International Journal of Computer Mathematics 91 (2) (2014)