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A MULTIPARAMETER MODEL FOR LINK ANALYSIS OF CITATION GRAPHS*

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Abstract. We propose a family of Markov chain-based models for the link analysis of scientific publications. The PageRank-style model and the dummy paper model discussed in [Electron. Trans. Numer. Anal., 33 (2008), pp. 1–16] can be obtained by a particular choice of its parameters. Since scientific publications can be ordered by the date of publication it is natural to assume a triangular structure for the adjacency matrix of the citation graph. This greatly simplifies the updating of the ranking vector if new papers are added to the database. In addition by assuming that the citation graph can be modeled as a fixed degree sequence random graph we can obtain an explicit estimation of the behavior of the entries of the ranking vector.

Key words. link analysis, citation graph, random graph, Markov chain, ranking

AMS subject classifications. 15B51, 60J20, 65C40

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