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f(A)bulous networks: an overview of matrix functions in network science

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Though seemingly they belong to two different worlds, matrix functions and network science have some degree of overlap thanks to a very simple fact; powers of the adjacency matrix count traversals in the underlying network. This concept in turn allows for the definition of centrality measures in terms of entries (or sums thereof) of functions of the adjacency matrix.

In this talk, after reviewing basic definitions, we will give an overview of popular walk-based centrality measures in networks, emphasizing the role of matrix functions and of expressions of the form $f(A)b$ and $c^T f(A)b$. We will further discuss nonbacktracking walk-based centralities and describe challenges and open problems.

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