Multi-dimensional nonlinear Perron-Frobenius theorem and its application to network centrality

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The nonlinear Perron-Frobenius theory (see [1] e.g.) addresses existence, uniqueness and maximality of positive eigenpairs for order-preserving homogeneous functions. This is an important and relatively recent generalization of the famous results for nonnegative matrices. In this talk I present a further generalization of this theory to "multi-dimensional" order-preserving and homogeneous maps, which we briefly call multi-homogeneous maps [2]. The results presented are then used to discuss a new eigenvector-based centrality measure for nodes and layers of a multi-layer network [3].

References

[1] B . Lemmens, R. D. Nussbaum, *Nonlinear Perron-Frobenius theory*, Cambridge University Press, 2012

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