Long-range influences in (social) networks

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Summary

In this talk I will introduce some problems that motivate the necessity of considering (non-random) long-range influences in social interactions. This motivation will be developed on the basis of the diffusion of innovations in social networks and a couple of examples will be provided. Then, I will develop a mathematical framework that allow to generalise the Laplacian operator on networks and propose a generalised diffusion equation on graphs. I will prove analytically that in one- and two-dimensional cases this new scheme gives rise to superdiffusive behaviours on networks. I will show how to extend this model to a random multi-hopper to be applied in real-world networks. Finally I will return to the problem of social systems showing some implications of the new model for selection of leaders, influence of leaders cohesiveness and diffusion of innovations.

Biography

Ernesto Estrada has an internationally leading reputation for shaping and developing the study of complex networks. His expertise ranges in the areas of network structure, algebraic network theory, dynamical systems on networks and the study of random models of networks. He has a distinguished track record of high-quality publications, which has attracted more than 10,000 citations. His h-index (number of papers with at least h citations) is 56. His publications are in the areas of network theory and its applications to social, ecological, engineering, physical, chemical and biological real-world problems. Professor Estrada has published two text books on network sciences both published by Oxford University Press in 2011 and 2015, respectively. He has demonstrated a continuous international leadership in his field where he has been invited and plenary speaker at the major conferences in network sciences and applied mathematics. He is the Editor-in-Chief of the Journal of Complex Networks (Oxford University Press) as well as an Editor of SIAM Journal of Applied Mathematics and of Proceedings of the Royal Society A