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LONG-LIVED FRUSTRATED STATES IN SOCIAL NETWORK DYNAMICS

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Yesterdays' friend/enemy rarely become tomorrows' enemy/ friend. Relations do not change easily in presence of memory. In fact, the ability of human beings to remember history of relations develops social concepts such as commitment and allegiance leading to the formation of cultural communities, alliances, and political groups. In order to investigate this effect on dynamic of social networks, we introduce a temporal kernel function into the Heider's balance theory, allowing the quality of past relations to contribute to the evolution of system. In this theory, relations between agents are considered as positive/negative links referring to friendship/animosity, profit/ nonprofit, etc. This theory proposes a model based on triadic configurations in which relations evolve to reduce the number of unbalanced triads and attain minimum tension states (balanced or jammed states). Considering memory results in the emergence of aged links which measures the aging process of the society. By increasing age of some relations, some nodes become more resist to change their relations, resulting in the formation a skeleton under the skin of society. Even though network's dynamic gets affected by memory, still the general trend of society dynamics goes towards obtaining stable states. The resistance of aged links against the changes decelerates the evolution of the society and traps it into long-lived frustrated states which can survive in unstable states in contrast to stable configurations.

Recent Publications

1. **Hedayatifar L et al. (2017) Pseudo paths towards minimum energy states in network dynamics. Physica A: Statistical Mechanics and its Applications 483(C):109-116.**
2. **Hassanibesheli F et al. (2017) Glassy States of Aging Social Networks. Entropy 19(6):246.**
3. **Hassanibesheli F et al. (2017) Gain and loss of esteem, direct reciprocity and Heider balance. Physica A: Statistical Mechanics and its Applications. 468:334-339.**

Biography

Leila Hedayatifar is a Recipient of numerous awards and grants including National Science Foundation Award and the International Center for Theoretical Physics Prize. As a Physicist at the New England Complex Systems Institute in the United States, her current research focuses on dynamics of social networks using mathematical and data analysis. Her seminal work has been recognized several times. She has published and presented over 30 articles in highly ranked peer-reviewed journals and conferences. She participated as a Scientific Board and Organizing Committee of several national and international meetings including the International Conference on Complex Systems. She is a Member of American Physical Society and International Complex Systems Society. She is serving as an Editorial and Reviewer of various scientific journals including journal of Big Data and Cognitive Computing, Entropy, and Sustainability.

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