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Influencing social networks: an optimal control study. (English) [Zbl 1366.91120](#)

Schaub, Torsten (ed.) et al., ECAI 2014. 21st European conference on artificial intelligence, Prague, Czech Republic, August 18–22, 2014. Proceedings. Including proceedings of the accompanied conference on prestigious applications of intelligent systems (PAIS 2014). Amsterdam: IOS Press (ISBN 978-1-61499-418-3/pbk; 978-1-61499-419-0/ebook). *Frontiers in Artificial Intelligence and Applications* 263, 105-110 (2014).

Summary: We study the evolution of cooperation in social networks, aiming in particular at ways of influencing the behavior in such networks using methods and techniques from optimal control theory. This is of importance to many scenarios where politicians or policy makers strive to push consensus on some topic that may seem suboptimal from individuals' perspectives. To this end, we employ the Continuous Action Iterated Prisoner's Dilemma (CAIPD) as model for the interactions in a social network. This model describes how neighboring nodes influence each other, and in effect determines how different strategies may spread through the network. We extend this model, incorporating a mechanism for external influence on the behavior of individual nodes. Next we prove reachability of an arbitrary network-wide agreement using the Lyapunov's Direct Method. Based on the theory of Linear-Quadratic Trackers we propose a step-wise iterative control algorithm, and show the effectiveness of the proposed controller in various Small World and Scale Free social networks.

For the entire collection see [\[Zbl 1296.68011\]](#).

MSC:

91D30 Social networks; opinion dynamics

93C15 Control/observation systems governed by ordinary differential equations

Cited in **3** Documents

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