Applied Mathematics Seminar

UCC
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Coláiste na hOllscoile Corcaigh

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Modeling radicalization dynamics and polarization transitions in temporal networks

Echo chambers and opinion polarization have been recently quantified in several sociopolitical contexts, across different social media, raising concerns for the potential impact on the spread of misinformation and the openness of debates. Despite increasing efforts, the dynamics leading to the emergence of these phenomena remain unclear. Here, we propose a model that introduces the phenomenon of radicalization, as a reinforcing mechanism driving the evolution to extreme opinions from moderate initial conditions. Empirically inspired by the dynamics of social interaction, we consider agents characterized by heterogeneous activities and homophily. We analytically characterize the transition from a global consensus to an emerging radicalization that depends on parameters, which can be interpreted as the controversialness of a topic and the strength of social influence people exert on each other. Finally, we offer a definition of echo-chambers via our model and contrast the model's behavior against empirical data of polarized debates on Twitter, qualitatively reproducing the observed relation between users' engagement and opinions, as well as opinion segregation based on the interaction network. Our findings shed light on the dynamics that may lie at the core of the emergence of echo chambers and polarization in social media.

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