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Session D47: Undergraduate Research IV

3:00 PM–5:48 PM, Monday, March 6, 2023

Room: Room 313

Sponsoring Unit: SPS

Chair: Kayla Stephens, AIP

Abstract: D47.00013 : Majority-vote model with limited visibility on scale-free networks*

5:24 PM–5:36 PM

← Abstract →

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Social internet networks are an essential part of humanity. With the advance of technology and the rise of algorithms and AI, content is now filtered systematically and facilitates the formation of filter bubbles. This work investigates the social influence under limited visibility in the two-state majority-vote model on scale-free networks. In the majority-vote evolution, each individual assimilates the opinion of the majority of their neighbors with probability $1-q$. They also go against with chance q , known as the noise parameter. We define the visibility parameter V of an individual as the probability of considering the opinion of one of his neighbors. The parameter V enables us to model the limited visibility phenomenon in the dynamics of the majority-vote model. We build the social network of interactions starting from a fully connected network with $z + 1$ nodes. New nodes are connected to z neighbors with probability proportional to each node's connectivity until we reach N nodes. We employ Monte Carlo simulations to calculate the critical noise parameter as a function of the visibility V and the growth parameter z and obtain the phase diagram of the model. Applying finite-size scaling analysis, we find the critical exponents β/ν and γ/ν of the model associated with the magnetization and susceptibility and validate the unitary relation.

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