A Kinetic Control Framework for Opinion Evolution in Adaptive Networks

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In this talk I will introduce an optimal control framework for opinion dynamics on popularity-adaptive social networks, where both opinion evolution and contact formation depend on agents' connectivity and the attractiveness of their opinions on a given topic. Within a kinetic modeling setting, we describe the coupled dynamics of opinions and social media popularity, incorporating endogenous feedback mechanisms that favor interactions with influential agents and reinforce mainstream positions. Control variables act on both opinions and contacts, representing interventions such as information campaigns, promotion strategies, or moderation policies. Numerical experiments, performed by Monte Carlo techniques, demonstrate how targeted control can limit polarization, sustain consensus, and steer opinion distributions in networks whose structure co-evolves with user popularity.

References

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[2] G. Albi, E. Calzola, and G. Dimarco. *A data-driven kinetic model for opinion dynamics with social network contacts*, European Journal of Applied Mathematics, 36(2) (2025), pp.264–290.