MODELING OPINION DYNAMICS

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The mathematics of collective behavior is largely concerned with studying what is known as 'emergent dynamics.' In short, emergent dynamics occur when local interactions lead to a global phenomenon. There are many naturally occurring examples of collective motion in biology and physics; from flocks of birds and schools of fish, to swarms of bacteria and synchronization of oscillators; as well as many applications available in technology and social sciences. In particular, the modeling of opinion dynamics has seen much study in recent years. Understanding the complex ways information can be disseminated is a complicated problem for mathematicians as well as social scientists. Opinions can be tracked as binary values (agreement or disagreement); as in the famous Voter Model or the Naming Game; or they can be continuous values where a larger value could correspond with agreement and lower with disagreement about a particular topic. Further, there are Bounded Confidence models that take into account with which other agents interactions can occur (e.g. only those with similar opinions), and models that incorporate the stubbornness of an agent, leading to disagreement, or compromises instead of consensus. In this short course we will introduce several important models of opinion dynamics, discuss their collective outcomes, and how they are connected to other phenomena within the field of collective behavior.

Prerequisites: None

Total Hours: 6

Schedule:
Monday 17/4: 9-11am,
Tuesday 18/4: 9-11am,
Thursday 20/4: 9-11am.

Table of Contents:

References

[1] Proskurnikov A, Tempo R A Tutorial on Modeling and Analysis of Dynamic Social Networks. Part I, Annual Reviews in Control, 43, 65-79. https://doi.org/10.1016/j.arcontrol.2017.03.002.
[2] Proskurnikov A, Tempo R A Tutorial on Modeling and Analysis of Dynamic Social Networks. Part II, Annual Reviews in Control, 45, 166-90. https://doi.org/10.1016/j.arcontrol.2018.03.005.