Applications of flow-networks to opinion-dynamics

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Networks were successfully applied to describe complex systems, such
as brain, climate, processes in society. Recently a socio-physical
problem of opinion-dynamics was studied using network techniques. We
present the toy-model of opinion-formation based on the physical
model of advection-diffusion. We consider spreading of the opinion on
the fixed subject, assuming that opinion on society is binary: if
person has opinion then the state of the node in the society-network
equals 1, if the person doesn't have opinion state of the node equals
0. Opinion can be spread from one person to another if they know each
other, or in the network-terminology, if the nodes are connected. We
include into the system governed by advection-diffusion equation the
external field to model such effects as for instance influence from
media. The assumptions for our model can be formulated as the
following:

1.the node-states are influenced by the network structure in such a
way, that opinion can be spread only between adjacent nodes (the
advective term of the opinion-dynamics),

2.the network evolution can have two scenarios:

-network topology is not changing with time;

-additional links can appear or disappear each time-step with fixed
probability which requires adaptive networks properties.

Considering these assumptions for our system we obtain the system of
equations describing our model-dynamics which corresponds well to
other socio-physics models, for instance, the model of the social

cohesion and the famous voter-model.

We investigate the behavior of the suggested model studying "waiting time" of the system, time to get to the stable state, stability of the model regimes for different values of model parameters and network topology.