

Fractional Dynamics of Individuals in Complex Networks

Bruce West, US Army Research Office

The dependence of the behavior of a single individual on the global dynamics of a complex social network to which it belongs is an open problem in sociology. We demonstrate that for a dynamical network belonging to the Ising universality class this problem can be approached analytically through a subordination procedure. The analysis leads to a linear fractional differential equation of motion for the average trajectory of the individual, whose analytic solution is a Mittag-Leffler function. Consequently, the analysis provides a linear description of the average dynamics of an individual, without linearization of the complex network dynamics.