

[P8] Opinion dynamics with time delay

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To understand time-delayed properties observed in some social interactions of the opinion dynamics, we introduce a time-delayed voter model in a one-dimensional lattice and study its coarsening dynamics. In this model, a voter at each lattice site i has one of two opinions ($s_i = \pm 1$). At each time step, a voter on a randomly chosen site i copies opinion of one of its two nearest-neighbors at a time τ in the past ($s_i(t + \tau) \rightarrow s_j(t)$). Without delay, the voter model is dual to the coagulating random walks. We show that the time-delayed voter model is dual to coagulating sleeping random walks. Due to this duality, we can introduce a sleeping random walks (τ -SRWs). Using the duality, we find that the density of active bonds $\rho(t) \equiv \langle (1 - s_i(t)s_{i+1}(t))/2 \rangle$ satisfies the scaling $\rho(t; \tau) = \rho_0(t/\tau^3)$ for $\tau > 1$, where $\rho_0(x \ll 1) \sim 1$ and $\rho_0(x \gg 1) \sim x^{-1/2}$.