[P2] Dynamic Scaling Behavior of a Directional Generalized Voter Model

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We study the non-equilibrium dynamics of a one-dimensional directional voter model with particle exchange. Each particle i has two different states represented by a spin $\sigma_i = \pm 1$. A pair of opposite spins $+-$ is randomly selected, and its state is updated to $++$ or $--$ with the probability $(1 - \alpha)$ [voter rule] or $-+$ with the probability [exchange]. Note that only $+\square$ domain walls are active while $-+$ domain walls are frozen or inactive. The model has two absorbing states with all spins up or down. We find that the active domain wall density ρ_s (i.e. the fraction of $+-$ pair) follows a power-law decay $t^{-\delta}$ at all values of $0 \leq \alpha \leq 1$. Especially, the critical exponent δ varies continuously with α. These results are obtained from extensive Monte-Carlo simulations and spectral analyses of the time evolution operator.