Ising model and forest fire

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Abstract

We use Ising Model as a paradigm to study fire forest spread. To take in account thermal radiation, a long range interaction is used. This corresponds to a particular case of Small World Network, deterministic one with an elliptic domain of interaction. In addition, a site weighting procedure induced by combustion time tc and ignition energy of combustible elements is introduced [1]
The universality of critical exponent near percolation threshold is used to investigate the wind effect on spread properties (delta exponent of external magnetic field and beta exponent of the magnetization)[2].
Moreover the behavior of these dynamical exponents is used to examine the ability of fire to spread (Fire susceptibility and it exponents as in magnetic system)[3-4], regardless the flammability of biomass, terrain and the rate of spread.

Keywords: fire behavior, non equilibrium phase transition (theory), critical exponents and amplitudes (theory), percolation problems (theory).

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