

# Some New Results for Zero Temperature Random Field Ising Model

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**Abstract.** We present some new results for dynamical critical behavior of the mean-field zero-temperature random-field Ising model. We base our analysis on the probability of finding a given sequence in the response signal, which has the form of a Markov chain with Poisson transition probabilities. This enabled us to give an exact description of the avalanche duration distribution, the absolute probabilities of signal values, and the signal time-autocorrelation function. The overall behavior of these quantities depends on their characteristic lengths, which all diverge near the critical point ( $z = 1$ ) as  $\sim 1/|\ln(z)|$ , where  $z$  is a control parameter of the underlying dynamics. Analytical findings are supplemented by the results of extensive simulations of mean-field and finite-dimensional (2d and 3d) model systems.

## REFERENCES

1. Spasojević, Dj., Janičević S., and Knežević, M., *Europhys. Lett.* **76**, 912-918 (2006).
2. Spasojević, Dj., Janičević S., and Knežević, M., *to be published*.
3. Sethna J. P., Dahmen K. A., and Perković O, "Random-Field Ising Models of Hysteresis" in *The Science of Hysteresis*, Vol. **2**, edited by Bertotti G. and Mayergoyz I., Amsterdam: Academic Press, 2005.