Renewal properties and microstructures of the $d = 1$ Ising Model

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Abstract:
We consider the $d = 1$ Ising model with (finite range) Kac potentials under the corresponding critical mean field temperature. We show that typical spin configurations have an infinite sequence of successive "plus" and "minus" intervals where the empirical magnetization change its sign. We study the marginal of the unique DLR measure on such an interval process and our main result is that despite the fact that its memory is infinite yet it can be realized as a renewal process. We also show that such behaviour persist when a small magnetic field is turned on and show how the typical lengths of the intervals change.