Scale invariant avalanches: a critical confusion

OSVANNY RAMOS, Laboratoire PMCN, University Lyon 1, 43 bd. du 11 novembre 1918, 69622 Villeurbanne, France — In the last decades considerable efforts have been devoted to understanding single events related to friction, fracture and unjamming transition, commonly denominated avalanches. However, in many different natural scenarios -from subcritical fracture to earthquake dynamics- these events are of all scales; a situation that has often been interpreted within the formalism of critical phenomena, and having as a relevant consequence the inherently unpredictability of scale-invariant avalanches. A revision of this interpretation which departs from standard ideas is presented here, resulting in [1]: (i) critical systems are not necessarily unpredictable; (ii) slowly driven systems evolving through power-law distributed avalanches are not necessarily critical; and (iii) scale-invariant avalanches are not necessarily unpredictable. Simple simulations and granular experiments [2] confirm the findings.


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