Distinguishing Characteristics of SOC-like Systems

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Abstract.

As Self-Organized Criticality (SOC) has been suggested as a relevant model for more and more plasmas, from magnetically confined fusion plasmas to space plasmas and other geophysical systems, the questions of how do we distinguish SOC systems and what do we gain by using this paradigm becomes more important. In this poster we will describe some of the dynamic signatures that may be used to compare systems. These include power spectra (in which people look for the ubiquitous 1/f signature, which might not be needed), quiet time statistics and Hurst exponent analysis. This discussion will include both the strengths and limitations of these measures and the types of regimes one must observe to further clarify the dynamics of the system. An explanation for the appearance or lack of the 1/f regime in the power spectrum will be given and we will also discuss analysis limitations due to data length effects. Finally, some comments will be made on the practical usefulness of SOC and extensions of this paradigm.