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Title:	Random links enhance the sensitivity of networks to heterogeneity
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Keywords:	bistable Random links heterogeneity
Issue Date:	2015
Publisher:	Institute of Physics Publishing
Citation:	EPL 112(6)
Abstract:	In this work we investigate the dynamics of networks of bistable elements with varying degrees of rRandom linksandomness in connections, considering both static random links and time-varying random links. We explore how the presence of a few dissimilar elements affects the collective features of this system, and find that a network with random links is hyper-sensitive to heterogeneity. Namely, counter-intuitively, even a small number of distinct elements manages to drastically influence the collective dynamics of the network, with the mean-field swinging to the steady state of the minority elements. We find that the transition in the collective field gets sharper as the fraction of random links increases, for both static and time-varying links. We also demonstrate that networks where the links are switched more frequently, synchronize faster. Lastly, we show that as global bias tends to a critical value, even a single different element manages to drag the entire system to the natural stable state of the minority element. So it is evident that when coupling connections are random, a network with even a very small number of links per node, has the ability to become ultra-sensitive to heterogeneity.
URI:	https://iopscience.iop.org/article/10.1209/0295-5075/112/60004 (https://iopscience.iop.org/article/10.1209/0295-5075/112/60004) http://hdl.handle.net/123456789/2724 (http://hdl.handle.net/123456789/2724)
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