Thermal and geometric critical behaviour on biased networks

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When bias is introduced in the interactions between nodes on a scale-free network, a powerful tool emerges for probing universality classes of thermal critical behavior. The exponent associated with the bias conspires with the topological exponent, and both inter-dependently regulate the critical exponents of static and dynamic cooperative phenomena [1]. Likewise, when bias is introduced in the depreciation of nodes or edges, the bias exponent affects the critical exponents of percolation in a similar way. Moreover, fragile networks can turn robust and vice versa, by tuning the bias [2]. When this is done on a non-scale-free network with a large but fixed number of nodes, the bias allows one to interpolate between preferential attachment models and explosive percolation [3].

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