

## Coupled order parameter system on a scale-free network

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The behaviour of a system with two coupled order parameters on a scale-free network is investigated. The phenomenological approach [1] is generalized into the case of two order parameters. As a microscopic background we consider an anisotropic spin system on a scale-free network in a mean-field approximation. The system is governed by non-trivial critical exponents, which coincide with ones in the case of a single order parameter system. We consider the appearance of logarithmic corrections to the critical exponents, which follow from the characteristic topology of the scale free network. These corrections appear already in mean field theory contrary to the situation in regular lattices where they are an effect of critical fluctuations. The universal amplitude ratios become non-trivial, the low temperature phase is described by a divergent susceptibility for the continuous symmetry [2].

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