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Spectral renormalization group theory on nonspatial networks ASLI TUNCER, AYSE ERZAN, Istanbul Tech Univ — We recently proposed a "spectral renormalization group" scheme, for non-spatial networks with no metric defined on them. We implemented the spectral renormalization group on two deterministic non-spatial networks without translational invariance, namely the Cayley tree and diamond lattice . The thermodynamic critical exponents for the Gaussian model are only functions of the spectral dimension, $\tilde{d}$. The Gaussian fixed point is stable with respect to a ψ^4 perturbation up to second order on these lattices with $\tilde{d} = 2$, the lower critical dimension for the Ising universality class. This is expected for the Cayley tree, but for the diamond lattice it is an indication that the perturbation expansion up to second order breaks down at $\tilde{d} = 2$, as it does for the Wilson scheme on the square lattice. On generalized diamond lattices, with $2 < \tilde{d} < 4$, we find non-Gaussian fixed points with non-trivial exponents. For $\tilde{d} > 4$, the critical behavior is once again mean field.

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