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Graphs, medial links and growth of spanning trees.

Let G be a countable, locally finite graph with a free action by \mathbb{Z}^d for some positive integer d . We describe a space of *conservative* vertex colorings of G that is a module over the ring of Laurent polynomials in d variables. This gives rise to polynomial invariants $\Delta_k(x_1, \dots, x_d)$.

When G is a plane graph with free \mathbb{Z} -action, Δ_0 determines the number of components of the associated medial link. In general, the Mahler measure of Δ_0 is the growth rate of spanning trees of G . This quantity, sometimes called the *thermodynamic limit* of G , has previously been calculated by purely analytic methods using partition functions.

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