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Testing a Divergence Free Nonrenormalizable Model JAMES STANKOWICZ, JOHN R. KLAUDER, University of Florida — By adding carefully constructed counter terms to the Lagrangian of ϕ_n^E scalar fields ($n > 4$, n the number of dimensions, $E = 4$, 6, 8, 10, or 12), it is possible to exactly cancel divergences that appear in calculating physical observables, such as the renormalized coupling constant (g_R). One method that should support the effectiveness of this method is a Monte Carlo calculation of g_R, computed by approximating spacetime as a multi-dimensional 'hypercubic' lattice, then looking at the continuum limit where the number of lattice points goes to infinity, and the spacing between lattice points goes to zero. For ϕ_4^6 theories, with the new counter terms added to the Lagrangian, g_R should approach a finite, non-zero value in the continuum limit, whereas g_R is known to approach zero in the continuum limit when the counter terms are not present. While qualitative agreement with results in literature has been obtained, statistical fluctuations in the current rendition of the algorithm make obtaining new results difficult. One work-around currently under investigation is to develop a base distribution for selecting new values of the field using only the derivative and quadratic terms of the lattice action, then perturbing that distribution with the quadratic terms of the lattice action for various g_0.

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