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The renormalization group equations revisited in the light of finite field theories.

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The analysis of physical observables in terms of energy/momentum scales necessitates to disentangle spurious scales originating from the divergence of ill-defined integrals from the physical scales inherent to the dynamics of a given system. The use of finite field theories is thus of particular interest in this separation. We shall investigate this question in the light of the recently proposed Taylor-Lagrange regularization scheme applied to light-front dynamics. We calculate the coefficients of the renormalization group equation in this scheme and compare them with the standard derivation using dimensional regularization in different renormalization schemes. We find that the renormalization group equations should be mass-dependent in any renormalization scheme, in contrast to what is usually assumed.

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