

Halpern and Huang Reply: The work [1] has been expanded and amended in [2], which shows that the RG equation (6) is correct only to linear order, but is otherwise rigorous. This means that the “fixed line” of [1] does not exist, but the proof of the existence of asymptotically free nontrivial scalar theories is rigorous.

(1) The proof is based on the eigenvectors of the RG matrix at the Gaussian fixed point, which is given by the linear terms in Eq. (6) of [1]. They are made rigorous in [2] by showing that they are valid even when arbitrary derivative and nonlocal couplings are taken into consideration.

(2) Substantiation has come from several sources. Periwai [3] rederived our results using Polchinsky’s method. Immirzi [4] pointed out that for $d = 2$ our asymptotically free theory coincides with the sine-Gordon theory, which is known to have a nontrivial asymptotically free sector [5]. Similar conclusions are indicated by Reuter and Wetterich [6] in the $d = 2$ Liouville theory.

In the model used by Morris [7], there is apparently an implicit restriction to polynomial potentials. As shown in [2], this always leads to a trivial theory. Polynomials fail to span the space of possible potentials, in particular the relevant subspace of exponentially rising potentials.

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