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Analytic solutions for scaling dimensions of highly irrelevant operators in LPA and $f(R)$ approximations

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We show that in the local potential approximation of the functional renormalization group, and in the $f(R)$ approximation to asymptotically safe gravity, a combination of Sturm-Liouville and WKB methods allows for an exact analytical solution for scaling dimensions of highly irrelevant operators. The results shed light on properties of these approximations and in particular on recent numerical evidence of almost Gaussian scaling in the $f(R)$ approximation and the extent to which these results are (non)universal.

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