

# Stability of Scalar Fields in Warped Extra Dimensions

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We show that it is possible to create an RS soft-wall model, a model with a compact extra dimension, without using fundamental branes. All that is required are bulk scalar fields minimally coupled to gravity. Of crucial importance is the stability of the size of the extra dimension. Without branes, one cannot easily implement the Goldberger-Wise mechanism, and instead it must be shown that the scalar configuration is stable in its own right. We use the superpotential approach for generating solutions, the so called 'fake supergravity' scenario, and show that configurations generated in such a way with  $N$  scalars coupled minimally to gravity are always free of tachyonic modes. We also analyze the existence of zero modes. We present a theorem that relates the number of zero modes to the parities of the background solutions, for which we also present some examples.

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