

## On the phase structure of a chiral invariant Higgs-Yukawa model

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Abstract: In the past the construction of Higgs-Yukawa models on the lattice was blocked by the lack of a consistent definition of a chiral invariant Yukawa coupling. Here, we consider a chiral invariant Higgs-Yukawa model based on the overlap operator  $D_{ov}$  realized by the Neuberger-Dirac operator. As a first step towards a numerical examination of this model we study its phase diagram by means of an analytic  $1/N_f$ -expansion, which is possible for small and for large Yukawa-couplings. In the case of strong Yukawa-couplings the model effectively becomes a non-local,  $O(4)$ -symmetric non-linear  $\sigma$ -model.