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Scalar potential analysis of the Z_5 multi-component dark matter model

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In recent years the multi-component scalar dark matter models with discrete symmetries \mathbb{Z}_N has been widely studied in the literature. Among them, the \mathbb{Z}_5 model proposes two complex fields that transform as singlets under the gauge group of Standard Model. The model has eleven free parameters that must be restricted. In that sense, the main purpose of this research is to develop an detailed analysis of the scalar potential with the objective to establish the perturbative unitarity, vacuum stability and positivity conditions, and finally to determine the viable parameter space of the model.

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