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Physical Texture Zero Generation via Weak Basis Transformations (WBT) for Majorana Neutrino

Abstract
In the context of the Standard Model, the phenomenon of neutrino oscillation requires the existence of non-zero masses and flavor mixing. This project proposes a phenomenological analysis of the lepton sector, assuming neutrinos are Majorana particles. Weak Basis Transformations (WBT) will be used to explore maximal configurations of texture zeros with physical significance in the mass matrices.

General Objective:
Explore the maximum number of viable physical texture zeros in mass matrices for a Majorana neutrino model using Weak Basis Transformations, aiming to find consistent models and make phenomenological predictions for the lightest neutrino mass and the mixing parameters of the PMNS matrix.

Specific Objectives:

- Apply the Weak Basis Transformations formalism to arbitrary leptonic mass matrices to systematically isolate physical degrees of freedom from non-physical ones.
- Establish the systems of equations relating the resulting matrix elements of the textures with oscillation observables, ensuring their mathematical and phenomenological consistency.
- Numerically evaluate the viable models to bound the allowed parameter space, predicting the angles and phases of the PMNS matrix in terms of neutrino masses.

Academic position of the presenting author

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