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Minimal Froggatt-Nielsen Textures

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The flavour problem of the Standard Model can be addressed through the Froggatt-Nielsen (FN) mechanism. In this work, we develop an approach to the study of FN textures building a direct link between FN-charge assignments and the measured masses and mixing angles via unitary transformations in flavour space. We specifically focus on the quark sector to identify the most economic FN models able to provide a dynamical and natural understanding of the flavour puzzle. Remarkably, we find viable FN textures, involving charges under the horizontal symmetry that do not exceed one in absolute value (in units of the flavon charge). Within our approach, we also explore the degree of tuning of FN models in solving the flavour problem via a measure analogous to the Barbieri-Giudice one. We find that most of the solutions do not involve peculiar cancellations in flavour space.

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