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Predicting the PMNS phase, theta_23 and fermion mass ratios from GUT flavour models with CSD2

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Constrained Sequential neutrino Dominance of type 2 (referred to as CSD2) is an attractive building block for Grand Unified Theory (GUT) flavour models because it predicts a non-zero leptonic mixing angle θ_{13}^{PMNS}, a deviation of θ_{23}^{PMNS} from $\pi/4$, as well as a leptonic Dirac CP phase δ^{PMNS} which is directly linked to the CP violation relevant for generating the baryon asymmetry via the leptogenesis mechanism. When embedded into GUT flavour models, these predictions are modified in a predictive way, depending on which GUT operators are responsible for generating the fermion Yukawa matrices. In this paper, we systematically investigate and classify the resulting predictions from $SU(5)$ based flavour models, in order to select the most promising routes for future model building.

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