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[Re]constructing Finite Flavour Groups: Horizontal Symmetry Scans from the Bottom-Up

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We present a novel procedure for identifying discrete, leptonic flavour symmetries, given a class of unitary mixing matrices. By creating explicit 3D representations for generators of residual symmetries in both the charged lepton and neutrino sector, we reconstruct large(r) non-abelian flavour groups using the GAP language for computational finite algebra. We use experimental data to construct only those generators that yield acceptable (or preferable) mixing patterns. Such an approach is advantageous because it 1) can reproduce known groups from other 'top-down' scans while elucidating their origins from residuals, 2) find new previously unconsidered groups, and 3) serve as a powerful model building tool for theorists wishing to explore exotic flavour scenarios. We test our procedure on a generalization of the canonical tri-bimaximal (TBM) form and discuss further work that is ongoing.

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