

Sequential Dominance in models of flavour

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(Constrained) Sequential Dominance

Assume:
$$Y^e = \begin{pmatrix} y_e & & \\ & y_\mu & \\ & & y_\tau \end{pmatrix}, \quad M_R = \begin{pmatrix} M_{\text{atm}} & & \\ & M_{\text{sol}} & \\ & & M_{\text{dec}} \end{pmatrix}$$

CSD(n)

$$Y^\nu = \begin{pmatrix} 0 & b \\ a & nb \\ a & (n-2)b \end{pmatrix}, \quad a, b \in \mathbb{C}$$



n: indexes this class of models

Neutrino mass matrix

$$m^\nu = m_a \begin{pmatrix} 0 & 0 & 0 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{pmatrix} + m_b e^{i\eta} \begin{pmatrix} 1 & n & n-2 \\ n & n^2 & n(n-2) \\ n-2 & n(n-2) & (n-2)^2 \end{pmatrix}$$

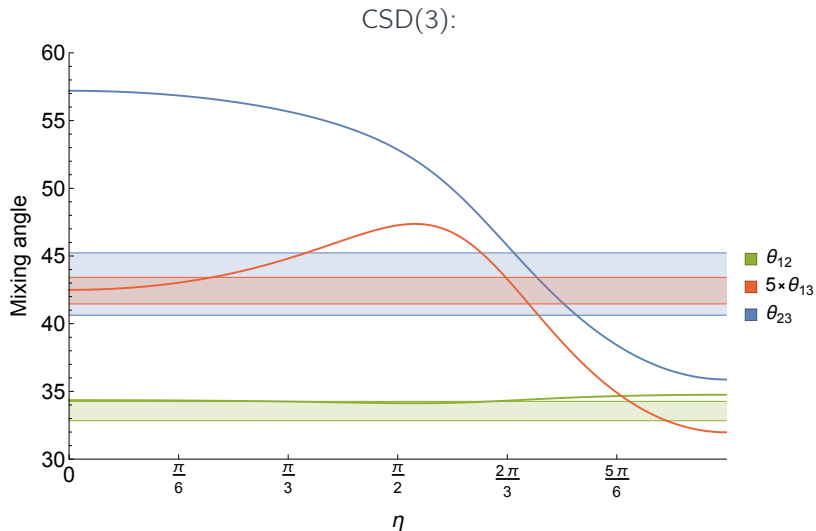
+ [almost decoupled 3rd neutrino]

Prediction

Normal mass hierarchy, i.e.

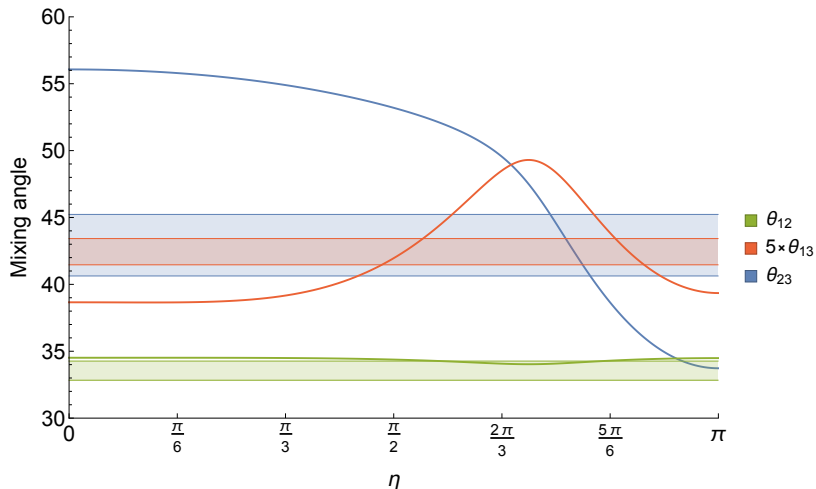
$$m_3 > m_2 \gg m_1$$

Numerical analysis of CSD(n) models

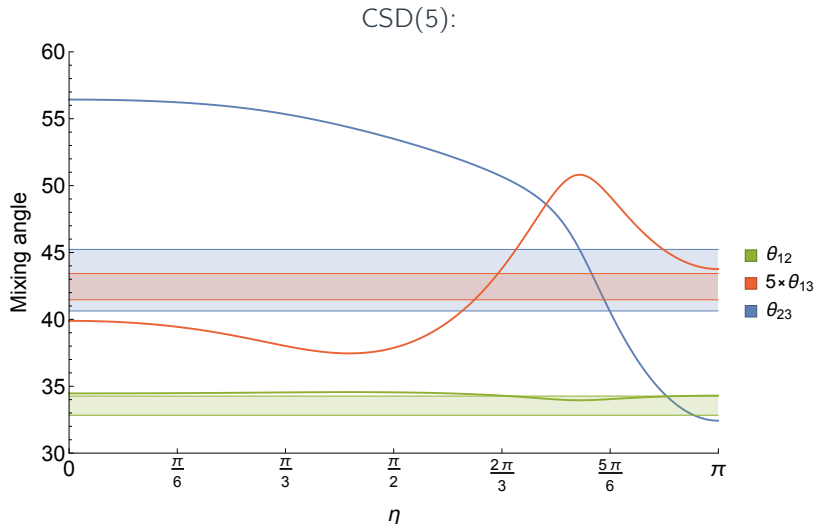


Numerical analysis of CSD(n) models

CSD(4):



Numerical analysis of CSD(n) models



Extensions

- Grand Unification
 - Successful integration into renormalisable, “natural” SUSY $SU(5)$
- Leptogenesis
 - Possible for CSD($3 \leq n \leq 5$)
 - Constraints on M_1 from Y_B
 - **Prediction:** $M_1 \sim (4 - 10) \times 10^{10}$ GeV

References

- *“From global fits of neutrino data to constrained sequential dominance”*
FB, Stephen F. King
[arXiv: 1412.6996]
- *“Towards a complete $A_4 \times SU(5)$ SUSY GUT”*
FB, Francisco J. de Anda, Ivo de Medeiros Varzielas, Stephen F. King
[arXiv: 1503.03306]
- *“Leptogenesis in minimal predictive seesaw models”*
FB, Francisco J. de Anda, Ivo de Medeiros Varzielas, Stephen F. King
[arXiv: 1505.05504]