

Ternary logic in lepton mass quantum numbers

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Abstract.

Koide's prediction [1] of the tau mass may be formulated as a condition on the three eigenvalues of a quantum Fourier series, using simple parameters, and similar triplets have been found for hadron masses [2]. Since one assumes that these parameters arise from quantum gravity, one would like to remove these linear maps from the context of ordinary Hilbert space quantum mechanics, to the more abstract setting of category theory [3].

The logic of lepton spin is a linear analogue of the ordinary Boolean logic of the category of sets. Mass triplets suggest an analogous ternary logic, which may require higher dimensional categorical structures. This talk looks at a few elements of ternary logic, and how the 3×3 matrix functions on a quantum torus may be interpreted in this setting.

Keywords: category theory, particle masses, ternary, quantum information

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REFERENCES

1. Y. Koide, Nuovo Cimento A70 (1982) 411
2. C. A. Brannen (2009), <http://www.brannenworks.com/koidehadrons.pdf>
3. S. Mac Lane and I. Moerdijk, Sheaves in Geometry and Logic, (1992) Springer