FINITE DIMENSIONAL IRREPS OF LORENTZ:

Labeled by \((m, \nu)\) with \(M^2 = m(m+1)\), \(N^2 = \nu(\nu+1)\), \(m, \nu = 0, \frac{1}{2}, 1, \frac{3}{2}, \ldots\)

Dimension \(2(m+1) \times (2\nu+1)\)

\(j = |m - \nu|, \ldots, |m + \nu|\)

Examples:

\((0,0)\) \(j = 0\) SCALAR

\((\frac{1}{2}, 0)\) \(j = \frac{1}{2}\) \(\psi^\alpha, \psi^\dot{\alpha}\) \(\alpha = 1, 2\)

\((\frac{1}{2}, 0) \oplus (0, \frac{1}{2})\) DIRAC SPINOR

\((\frac{1}{2}, \frac{1}{2})\) \(j = 0, 1\) VECTOR \(A^\mu\)

\((1,0)\) \(j = 1\) (ANTI-)SELF DUAL ANTI-SYM.

\((0, 1)\) \(j = 1\) FM

\((1,0) \oplus (0,1)\) ANTI SYM SECOND RANK TENSOR

\((1,1)\) \(j = 0, \frac{3}{2}\) SYM 2ND RANK TENSOR