Pauli's matrices

$$\sigma^1 = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \quad \sigma^2 = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix} \quad \sigma^3 = \begin{pmatrix} 1 & \\ & -1 \end{pmatrix}$$

Gamma matrices in various representations

Clifford Algebra: $\{\gamma^\mu, \gamma^\nu\} = 2g^{\mu\nu}$

see P. Pal arxiv: physics/0703214 (2013) for representation indep. identities

Chiral Representation (Weyl)

$$\gamma^\mu = \begin{pmatrix} & \sigma^\mu_{\alpha\dot\beta} \\ \bar\sigma^{\mu\dot\alpha\beta} & \end{pmatrix} \qquad \gamma_5 = i\gamma^0\gamma^1\gamma^2\gamma^3 = \begin{pmatrix} -\delta_\alpha{}^\beta & \\ & \delta^{\dot\alpha}{}_{\dot\beta} \end{pmatrix}$$

$$\gamma^0 = \begin{pmatrix} & & 1 & \\ & & & 1 \\ 1 & & & \\ & 1 & & \end{pmatrix} \quad \gamma^1 = \begin{pmatrix} & & & 1 \\ & & 1 & \\ & -1 & & \\ -1 & & & \end{pmatrix} \quad \gamma^2 = \begin{pmatrix} & & & -i \\ & & i & \\ & i & & \\ -i & & & \end{pmatrix} \quad \gamma^3 = \begin{pmatrix} & & 1 & \\ & & & -1 \\ -1 & & & \\ & 1 & & \end{pmatrix} \quad \gamma_5 = \begin{pmatrix} -1 & & & \\ & -1 & & \\ & & 1 & \\ & & & 1 \end{pmatrix}$$

γ^0	γ^1	γ^2	γ^3	γ_5
symm.	antisymm.	symm.	antisymm.	symm.
real	real	imaginary	real	real
Hermitian	antiHermitian	antiHermitian	antiHermitian	Hermitian

$$\psi = \begin{pmatrix} \psi_L \\ \psi_R \end{pmatrix} \qquad C = i\gamma^2\gamma^0 = \begin{pmatrix} & 1 & & \\ -1 & & & \\ & & & -1 \\ & & 1 & \end{pmatrix} \qquad T =$$

Standard Representation (Dirac)

$$\gamma^0 = \begin{pmatrix} \mathbb{1} & \\ & -\mathbb{1} \end{pmatrix} \qquad \gamma^i = \begin{pmatrix} & \sigma^i \\ -\sigma^i & \end{pmatrix} \qquad \gamma_5 = \begin{pmatrix} & \mathbb{1} \\ \mathbb{1} & \end{pmatrix}$$

$$\gamma^0 = \begin{pmatrix} 1 & & & \\ & 1 & & \\ & & -1 & \\ & & & -1 \end{pmatrix} \quad \gamma^1 = \begin{pmatrix} & & & 1 \\ & & 1 & \\ & -1 & & \\ -1 & & & \end{pmatrix} \quad \gamma^2 = \begin{pmatrix} & & & -i \\ & & i & \\ & i & & \\ -i & & & \end{pmatrix} \quad \gamma^3 = \begin{pmatrix} & & 1 & \\ & & & -1 \\ -1 & & & \\ & 1 & & \end{pmatrix} \quad \gamma_5 = \begin{pmatrix} & & 1 & \\ & & & 1 \\ 1 & & & \\ & 1 & & \end{pmatrix}$$

γ^0	γ^1	γ^2	γ^3	γ_5
symm.	antisymm.	symm.	antisymm.	symm.
real	real	imaginary	real	real
Hermitian	antiHermitian	antiHermitian	antiHermitian	Hermitian

$$\psi = \frac{1}{\sqrt{2}} \begin{pmatrix} \psi_L + \psi_R \\ -\psi_L + \psi_R \end{pmatrix} = \begin{pmatrix} \psi_{Big} \\ \psi_{Small} \end{pmatrix} \qquad C = i\gamma^2\gamma^0 = \begin{pmatrix} & & & -1 \\ & & 1 & \\ & -1 & & \\ 1 & & & \end{pmatrix} \qquad T =$$

$$C^{-1} = -C$$

Real Representation (Majorana)

$$\gamma^0 = \begin{pmatrix} & & & -i \\ & & i & \\ & -i & & \\ i & & & \end{pmatrix} \quad \gamma^1 = \begin{pmatrix} i & & & \\ & -i & & \\ & & i & \\ & & & -i \end{pmatrix} \quad \gamma^2 = \begin{pmatrix} & & & i \\ & & -i & \\ & -i & & \\ i & & & \end{pmatrix} \quad \gamma^3 = \begin{pmatrix} & -i & & \\ -i & & & \\ & & & -i \\ & & -i & \end{pmatrix} \quad \gamma_5 = \begin{pmatrix} & -i & & \\ i & & & \\ & & & i \\ & & -i & \end{pmatrix}$$

γ^0	γ^1	γ^2	γ^3	γ_5
antisymm.	symm.	symm.	symm.	antisymmetric
imaginary	imaginary	imaginary	imaginary	imaginary
Hermitian	antiHermitian	antiHermitian	antiHermitian	Hermitian

$$C = -\gamma^0 = \begin{pmatrix} & & & i \\ & & -i & \\ & i & & \\ -i & & & \end{pmatrix}$$