in d-dimensions. In QSR calculations using dimensional regularization it is conventional to define γ_5 such that $\{\gamma_5\,,\gamma_\mu\}=0$ [89]. The charge conjugation operator is defined as

$$C = i\gamma^2\gamma^0\,. \tag{A.4}$$

The following properties are useful in Chapters 4 and 5:

$$C^{-1}=C^T=-C\,,\quad C^2=-1\,,\quad C\gamma_\mu^T C=\gamma_\mu\,,\quad [C\,,\gamma_5]=0\,, \tag{A.5}$$

where T denotes the transpose.

Natural units are used, where $\hbar=c=1$. Using the relativistic invariant it can be shown that

$$E^2=(\mathbf{p}c)^2+\left(mc^2\right)^2\,,\quad \xrightarrow{c=1}\quad [E]=[\mathbf{p}]=[m]\,, \tag{A.6}$$

so that energy, momentum and mass have identical dimensions in this system of units. It is conventional to chose energy units as the base unit for all quantities. For instance, in natural units the masses of the electron and proton are approximately 0.511 MeV and 938 MeV, respectively.

Dimensional analysis in natural units is straightforward. We define $[m]=1$, from which it follows that $[E]=[\mathbf{p}]=[p_\mu]=1$. Because momenta and derivatives are related through Fourier transforms, $[\partial_\mu]=[p_\mu]=1$. From the expression for a plane wave it can be shown that

$$e^{ip\cdot x}\quad\rightarrow\quad [p\cdot x]=0\,,\quad\rightarrow\quad [x]=-1\,, \tag{A.7}$$