euclidian QCD Lagrangian:

$$\mathcal{L}^E_{QCD}(x) = \bar{\psi}(\gamma^E_\mu D_\mu + m)\psi + \frac{1}{2}\mathrm{Tr}G_{\mu\nu}G_{\mu\nu}$$

(euclidian Dirac matrices $\{\gamma^E_\mu, \gamma^E_\nu\} = 2\delta_{\mu\nu}$)

euclidian action:

$$S^E_{QCD}(A_\mu, \psi\bar{\psi}) = \int_0^{T^{-1}} d\tau \int_V d^3x\, \mathcal{L}^E_{QCD}(x)$$

lattice: $N_s^3 \times N_\tau \times a^4$

$$T^{-1} = N_\tau a \quad , \quad V = (N_s a)^3$$

$$\frac{\partial}{\partial T}, \frac{\partial}{\partial V} \rightarrow \frac{\partial}{\partial a}$$

discretization:

$$U^\mu(x) = e^{ig\int_x^{x+a\hat{\mu}} dy A_\mu(x+y)}$$

gluon fields: $U^\mu(x) \rightarrow U^\mu_n$ link variable

quark fields: $\psi(x) \rightarrow \psi_n$ site variable