

Partition function

$$Z = \text{Tr} \left[e^{-\beta \hat{H}} \right]$$

?

Tensor network

$$Z = g \text{Tr} \left[\prod_{n \in \Lambda} \mathcal{T}_{\Psi_1(n) \dots \Psi_d(n) \bar{\Psi}_d(n-\hat{d}) \bar{\Psi}_1(n-\hat{1})} \right]$$

Inserting a complete set
in temporal direction

Path integral

$$Z = \int [\mathrm{d}\psi \mathrm{d}\bar{\psi}] e^{-S[\psi, \bar{\psi}]}$$

Auxiliary Grassmann fields
in spatial and temporal directions