⬆ Spins $S_i = \pm 1$

⬛ Fermions $\hat{n}_i = \{0, 1\}$

⋯ Interaction $U\, S_i(\hat{n}_i - 1/2)$

— Hopping $-t\, \hat{c}_i^\dagger \hat{c}_{i+1}$

⋯ Long Range Interaction $J_{ij} S_i S_j$

$i-1 \quad i \quad i+1$