# Exact Solutions of a Quadratic Many-Body Spin ½ Fermionic Hamiltonian with Pairing and No-Double-Occupancy Constraint

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We present the exact solutions of a quadratic many-body spin ½ Fermionic Hamiltonian with paring terms and no-double-occupancy constraint. We show that the no-double-occupancy constraint will lead to the split of the ground state into two chiral symmetry breaking parts using the onsite Bogolyubov transformation, each corresponds to a respective effective Hamiltonian. Additional splitting of the ground state into different topological ordered parts are also explored and examples are presented. The no-double-occupancy constrained ground state solution can be shown to be the exact solution to the Hubbard model.