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The One-Hole, One-Dimensional Hubbard Model at $U = \infty$
WILLIAM HODGE, NATALIE HOLZWARTH, WILLIAM KERR, Wake Forest University — The Hubbard Hamiltonian is the simplest model that describes interacting electrons on a lattice. In this work, we use the properties of stochastic matrices to examine the ground state with an even number of lattice sites and one electron less than half-filling. We show that there exists a highly symmetric state with energy -2 (in units where $t = 1$) at all U . At $U = \infty$ this state becomes the lowest energy state, consistent with the established lower energy bound.¹ Using this result, several properties of the strongly coupled ground state are derived, including the chemical potential and momentum distribution. This method may be applicable to other models as well. Disagreements between our results and previous work are examined.

¹S. A. Trugman, Phys. Rev. B **42**, 6612 (1990)

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