The N-Representability Problem for Reduced Density Operators

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Abstract

In the seminar, we will discuss the N-representability problem for fermionic systems in terms of the Pauli exclusion principle and eigenvalues for reduced density matrices (operators). It has been proven that a one-particle reduced density operator is admissible, or there exists a density operator for N-particle systems corresponding to the wavefunction for Schrödinger equations, if and only if the operator is less than or equal to 1. The convexity for distribution of eigenvalues is essential in the proof. We are to go around the proof in detail to understand an important role of reduced density operators when we are faced to estimate the energies for quantum many-body systems.