Nodal structures and analytical properties of many-body wavefunctions for quantum Monte Carlo LUBOS MITAS, North Carolina State University — The node of many-body stationary wavefunction is the set of configurations for which the wavefunction vanishes. Its accuracy plays an important role in quantum Monte Carlo methods where it enables to avoid the fermion sign problem in the fixed-node approximation simulations. We investigate several aspects of fermion nodes. In particular, we elucidate the analytical properties of nodes and their relationship to quantities such as kinetic and total energies. We study how nodal locus errors impact the local energy distributions and their asymptotic properties. We also study the nodes of fermionic excited states and their topologies in comparison with the ground states.

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Date submitted: 19 Nov 2009   Electronic form version 1.4