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A Many Body Eigenvalue Problem for Quantum Computation SELMAN HERSHFIELD, University of Florida — A one dimensional many body Hamiltonian is presented whose eigenvalues are related to the order of G_N. This is the same order of G_N used to decode the RSA algorithm. For some values of N the Hamiltonian is a noninteracting fermion problem. For other values of N the Hamiltonian is a quantum impurity problem with fermions interacting with a spin-like object. However, the generic case has fermions or spins interacting with higher order interactions beyond two body interactions. Because this is a mapping between two different classes of problems, one of interest in quantum computing and the other a more traditional condensed matter physics Hamiltonian, we will show (i) how knowledge of the order of G_N can be used to solve some novel one dimensional strongly correlated problems and (ii) how numerical techniques, particularly for quantum impurity limit, can be used to find the order of G_N.

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