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Ground State of the Falicov-Kimball Model WILLIAM J. MASSANO, SUNY Maritime, Fort Schuyler, NY, JAY D. MANCINI, Kingsborough College of CUNY, Brooklyn, NY, VASSILIOS FESSATIDIS, Fordham University, Bronx, NY, SAMUEL P. BOWEN, Chicago State University, Chicago, IL — Here we wish to consider the ground state of the spinless Falicov-Kimball model, which represents one of the few mathematical models that describe strong electron-electron correlations and is exactly solvable (in the infinite dimensional limit). The model itself describes the order- disorder transitions of annealed binary alloys wherein itinerant electrons interact locally with static ions. A Coupled Cluster Method approach will be used to evaluate the ground state properties of the system. Here the wave function for the many particle interacting system is given by $|\Psi\rangle = e^s |\Psi_0\rangle$ where the operator S represents all one particle, two particle, ..., etc. interactions. A set of non linear equations is generated from the matrix elements $E_0 = \langle\Psi_0| H |\Psi_0\rangle$ and $\langle\Psi_0| H |\Psi_n\rangle = 0$ from which the ground state energy E_0 may be computed.

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