Hartree-Fock calculations for nuclear physics

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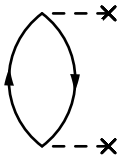
1 Many-body perturbation theory

1.1 Corrections for ground-state energy

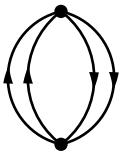
1.2 Corrections for an expectation value of scalar operators

Table 1: Hugenholtz diagrams for the ground-state energy up to the third order. Note that the first order contributions are omitted. The cross and dot indicate the one- and two-body part of Hamiltonian, respectively. The diagram rules are same as in Ref. [**?**].

Second order

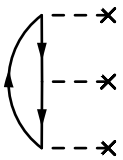


S_1

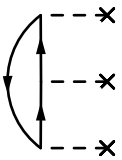


S_2

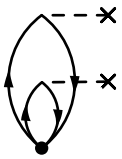
Third order



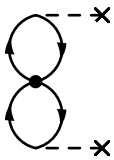
T_1



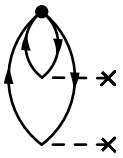
T_2



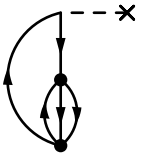
T_3



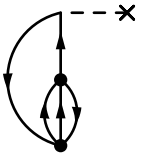
T_4



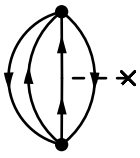
T_5



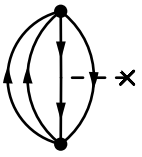
T_6



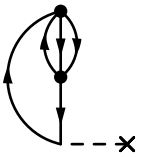
T_7



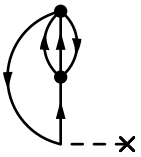
T_8



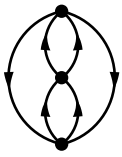
T_9



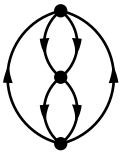
T_{10}



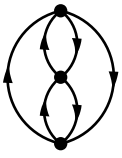
T_{11}



T_{12}



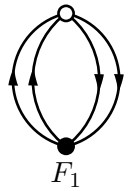
T_{13}

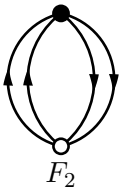


T_{14}

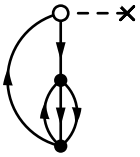
Table 2: Hugenholtz diagrams for the ground-state expectation value of a scalar operator up to the second order. The solid and open circles indicate Hamiltonian and scalar operators, respectively. The Hartree-Fock basis is assumed. The diagram rules are same as in Ref. [**?**].

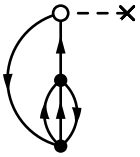
First order

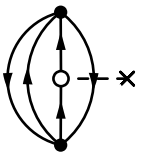

F_1


F_2

Second order


S_1


S_2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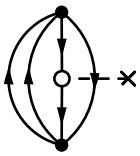
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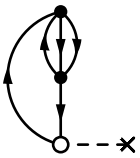
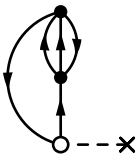

S_5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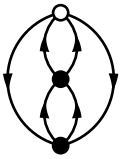
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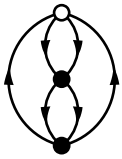
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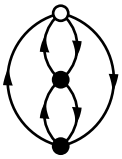
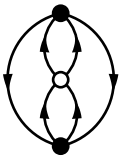
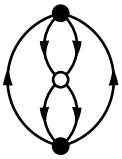

S_9


S_{10}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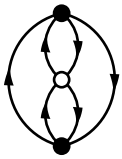
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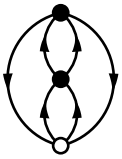
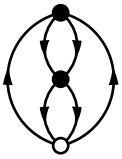
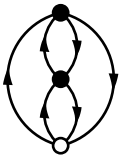

S_{13}


S_{14}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