Diagrammatic Monte Carlo for Correlated Fermions

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— We show that Monte Carlo sampling of the Feynman diagrammatic series (DiagMC) can be used for tackling hard fermionic quantum many-body problems in the thermodynamic limit by presenting accurate results for the repulsive Hubbard model in the correlated Fermi liquid regime. Sampling Feynman’s diagrammatic series for the single-particle self-energy we can study moderate values of the on-site repulsion ($U/t \sim 4$) and temperatures down to $T/t = 1/40$. We compare our results with high temperature series expansion and with single-site and cluster dynamical mean-field theory.