

Towards a real-time impurity solver using tensor train decomposition

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Keldysh diagrammatic expansions allow unbiased access to real-time correlators through a perturbative series. Obtaining the coefficients of said series require computing high-dimensional integrals, usually with Monte-Carlo sampling [1]. We instead use Tensor Cross Interpolation [2], a tensor compression technique originating from the MPS community, to perform the calculations. We obtain coefficients for benchmark impurity problems (flat, semi-circular, and DMFT self-consistent bath) at zero and finite temperature, with an order of magnitude speedup. We perform conformal map resummation [3] automatically and obtain spectral functions up to high Coulomb coupling, with sufficient resolution to observe Kondo physics.

[1] doi.org/10.1103/PhysRevB.100.125129.

[2] doi.org/10.21468/SciPostPhys.18.3.104.

[3] doi.org/10.1103/PhysRevX.9.041008.