Real-time dynamics with FRG: overcoming the burden of analytic continuation

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Abstract

While functional renormalization group (FRG) has been applied with success to the study of the thermodynamics of both classical- and quantum-critical systems, the dynamics of such systems, encoded in the real-time frequency dependent correlation functions, is harder to capture. These correlation functions are generally obtained through numerical analytic continuation of the imaginary-time results of the flow equations. Although this approach has been successful in classical and zero-temperature quantum systems, it is of little use for finite-temperature quantum systems. We present here an alternative approach, where the analytic continuation is made at the level of the flow equations themselves. We compare with the litterature the zero-temperature correlation functions and provide results at finite temperature.

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