Universal Scaling in Far-From-Equilibrium Quantum Systems: An Equivalent Differential Approach

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A challenging task has been understanding the route an out-of-equilibrium system takes to its thermalized state. Recent works indicate that some far-from-equilibrium systems display universal dynamics when close to a non-thermal fixed point (NTFP). In this work, we introduce a differential equation that has the universal scaling associated with NTFPs as a solution. The advantage of working with a differential equation, rather than only with its solution, is that we can extract several insightful properties not present in the solution alone. This equation can be applied to any system where NTFPs are present, but here we focus on studying Bose gases. The equation and its implications hold the potential to offer unexplored insights into the investigation of turbulence.