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Unified approach to the derivation of work theorems for equilibrium and steady-state, classical and quantum Hamiltonian systems DANIEL KOSOV, University of Maryland, MAXIM GELIN, TU Munich — The fluctuation theorems rigorously relate equilibrium ensemble properties of a dynamical system with its evolution under nonequilibrium conditions, beyond the domain of validity of the linear response theory. We present a unified and simple method for deriving work theorems for classical and quantum Hamiltonian systems, both under equilibrium conditions and in a steady state. We adopt the partitioning of the total Hamiltonian into the system part, the bath part, and their coupling. We rederive many equalities which are available in the literature and obtain a number of new equalities for nonequilibrium classical and quantum systems. Our results can be useful for determining partition functions and generalized free energies through simulations or measurements performed on nonequilibrium systems. We derive a semiclassical version of the work theorem and discuss the definition of semicalssical work operator. Phys.Rev. E 78, 011116 (2008)

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