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Total cost of operating an information engine JAEGON UM, Korea Institute for Advanced Study, HAYE HINRICHSEN, University of Wuerzburg, CHULAN KWON, Myongji University, HYUNGGYU PARK, Korea Institute for Advanced Study — We study a two-level system controlled in a discrete feedback loop, modeling both the system and the controller in terms of stochastic Markov processes. We find that the extracted work, which is known to be bounded from above by the mutual information acquired during measurement, has to be compensated by an additional energy supply during the measurement process itself, which is bounded by the mutual information from below. Our results confirm that the total cost to operate an information engine is in full agreement with the conventional second law of thermodynamics. We also consider the efficiency of the information engine in the finite-time case.

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