

Abstract Submitted
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Energy and efficiency optimization of a Brownian heat engine¹

MULUGETA BEKELE, Department of Physics, Addis Ababa University, Addis Ababa, Ethiopia, YENENEH YALEW, Eindhoven University of Technology, Eindhoven, The Netherlands — A simple Brownian heat engine is modeled as a Brownian particle moving in an external sawtooth potential (with or without) load assisted by the thermal kick it gets from alternately placed hot and cold heat reservoirs along its path. We get closed form expression for its current in terms of the parameters characterizing the model. After analyzing the way it consumes energy to do useful work, we also get closed form expressions for its efficiency as well as for its coefficient of performance when the engine performs as a refrigerator. Recently suggested optimization criteria enables us to exhaustively explore and compare the different operating conditions of the engine.

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Mulugeta Bekele
Department of Physics, Addis Ababa University, Addis Ababa, Ethiopia

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