Title:	Global linear-irreversible principle for optimization in finite-time thermodynamics
Authors:	Johal, R.S. (/jspui/browse?type=author&value=Johal%2C+R.S.)
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Abstract:	There is intense effort into understanding the universal properties of finite-time models of thermal machines —at optimal performance— such as efficiency at maximum power, coefficient of performance at maximum cooling power, and other such criteria. In this letter, a global principle consistent with linear irreversible thermodynamics is proposed for the whole cycle —without considering details of irreversibilities in the individual steps of the cycle. This helps to express the total duration of the cycle as $\tau \propto {\bar{Q}^2}/{\Delta_\text{tot}S}$, where $\bar{Q}$ models the effective heat transferred through the machine during the cycle, and $\Delta_ \text{tot} S$ is the total entropy generated. By taking $\bar{Q}$ in the form of simple algebraic means (such as arithmetic and geometric means) over the heats exchanged by the reservoirs, the present approach is able to predict various standard expressions for figures of merit at optimal performance, as well as the bounds respected by them. It simplifies the optimization procedure to a one-parameter optimization, and provides a fresh perspective on the issue of universality at optimal performance, for small difference in reservoir temperatures. As an illustration, we compare the performance of a partially optimized four-step endoreversible cycle with the present approach.
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