Title:	Optimal performance of heat engines with a finite source or sink and inequalities between means
Authors:	Johal, R.S. (/jspui/browse?type=author&value=Johal%2C+R.S.)
Keywords:	Extraction Finite heat capacity Optimal work
Issue Date:	2016
Publisher:	American Physical Society
Citation:	Physical Review E,94(1).
Abstract:	Given a system with a finite heat capacity and a heat reservoir, and two values of initial temperatures, T + and T − (< T +) , we inquire, in which case is the optimal work extraction larger: when the reservoir is an infinite source at T + and the system is a sink at T − , or, when the reservoir is an infinite sink at T − and the system acts as a source at T + ? It is found that in order to compare the total extracted work, and the corresponding efficiency in the two cases, we need to consider three regimes as suggested by an inequality, the so-called arithmetic mean-geometric mean inequality, involving the arithmetic and the geometric means of the two temperature values T + and T − . In each of these regimes, the efficiency at total work obeys certain universal bounds, given only in terms of the ratio of initial temperatures. The general theoretical results are exemplified for thermodynamic systems for which internal energy and temperature are power laws of the entropy. The conclusions may serve as benchmarks in the design of heat engines, where we can choose the nature of the finite system, so as to tune the total extractable work and/or the corresponding efficiency.
URI:	https://journals.aps.org/pre/abstract/10.1103/PhysRevE.94.012123 (https://journals.aps.org/pre/abstract/10.1103/PhysRevE.94.012123) http://hdl.handle.net/123456789/2525 (http://hdl.handle.net/123456789/2525)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need to add pdf.odt (/jspui/bitstream/123456789/2525/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text	View/Open (/jspui/bitstream/12345

Show full item record (/jspui/handle/123456789/2525?mode=full)
(/jspui/handle/123456789/2525/statistics)