Title:	Reversible Heat Engines: Bounds on Estimated Efficiency from Inference
Authors:	Johal, R.S. (/jspui/browse?type=author&value=Johal%2C+R.S.)
Keywords:	Inference Prior information Prior information Thermal efficiency Irreversibility
Issue Date:	2014
Publisher:	Springer
Citation:	Foundations of Physics, 45(2), pp.158-170.
Abstract:	We consider work extraction from two finite reservoirs with constant heat capacity, when the thermodynamic coordinates of the process are not fully specified, i.e., are described by probabilities only. Incomplete information refers to both the specific value of the temperature as well as the label of the reservoir to which it is assigned. Based on the concept of inference, we characterize the reduced performance resulting from this lack of control. Indeed, the estimates for the average efficiency reveal that uncertainty regarding the exact labels reduces the maximal expected efficiency below the Carnot value (ηC), its minimum value reproducing the well known Curzon–Ahlborn value: 1−1−ηC−−−−−√. We also estimate the efficiency before the value of the temperature is revealed. It is found that if the labels are known with certainty, then in the near-equilibrium limit the efficiency scales as ηC/2, while if there is maximal uncertainty in the labels, then the average estimate for efficiency drops to ηC/3. We also suggest how the inferred properties of the incomplete model can be mapped onto a model with complete information but with an additional source of thermodynamic irreversibility.
Description:	Only IISERM authors are available in the record.
URI:	https://link.springer.com/article/10.1007%2Fs10701-014-9856-3 (https://link.springer.com/article/10.1007%2Fs10701-014-9856-3) http://hdl.handle.net/123456789/3146 (http://hdl.handle.net/123456789/3146)
Appears in Collections:	Research Articles (/jspui/handle/123456789/9)

Files in This Item:

File	Description	Size	Format	
Need to add pdf.odt (/jspui/bitstream/123456789/3146/1/Need%20to%20add%20pdf.odt)		8.63 kB	OpenDocument Text	View/Open (/jspui/bitstream/12345

Show full item record (/jspui/handle/123456789/3146?mode=full)
(/jspui/handle/123456789/3146/statistics)