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Title:	Form of prior for constrained thermodynamic processes with uncertainty
Authors:	Aneja, Preety (/jspui/browse?type=author&value=Aneja%2C+Preety) Johal, R.S. (/jspui/browse?type=author&value=Johal%2C+R.S.)
Keywords:	thermodynamic Statistical and Nonlinear Physics
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Abstract:	We consider the quasi-static thermodynamic processes with constraints, but with additional uncertainty about the control parameters. Motivated by inductive reasoning, we assign prior distribution that provides a rational guess about likely values of the uncertain parameters. The priors are derived explicitly for both the entropy-conserving and the energy-conserving processes. The proposed form is useful when the constraint equation cannot be treated analytically. The inference is performed using spin-1/2 systems as models for heat reservoirs. Analytical results are derived in the high-temperatures limit. An agreement beyond linear response is found between the estimates of thermal quantities and their optimal values obtained from extremum principles. We also seek an intuitive interpretation for the prior and the estimated value of temperature obtained therefrom. We find that the prior over temperature becomes uniform over the quantity kept conserved in the process.
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