Title:	Study of heat engines in short time regime by using Maxwell-Cattaneo equation
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Abstract:	Carnot in 1824, set up the cornerstone for the classical heat engines by giving the maximum possible efficiency, which is well known as the Carnot efficiency T C T H But one can not obtain the Carnot efficiency in reality because the power produc- tion in the Carnot engine is zero due to infeasibly large cycle times. The bound for the heat engine at non-zero power was set up by Curzon and Ahlborn in 1975, given by η c = 1 − T C T H For it, Curzon and Ahlborn consider Carnot-like engine cycling for finite time , in which the heat flux transfer from the reservoirs was assumed to follow linear law (Newton law) of the heat flux transfer. But one can take any valid form of the heat flux transfer law for same model which can change the results. De Vos and N. V. Orlov have set up upper and lower bounds to the efficiency by considering the inverse law of heat flux transfer, given by η CA = 1 − η C η C ≤ η ≤ 2 2 − η C In this work, we included Maxwell-Cattaneo equation to generalize the model taken by Curzon and Ahlborn, by using two heat flux transfer laws, Newton law and inverse law. We have done analytical and numerical calculations for two heat transfer laws. For analytical calculations, we have included an assumption that the relaxation time of the working substance is larger than the operational time of the heat engine. The assumption helped us to study the cases in short time regime(with respect to relaxation time). And for numerical calculations, we have used ”Mathematica”.
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