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Title:	Multi-level quantum diesel engine of non-interacting fermions in a one-dimensional box
Authors:	Singh, Satnam (/jspui/browse?type=author&value=Singh%2C+Satnam) Rebari, S. (/jspui/browse?type=author&value=Rebari%2C+S.)
Keywords:	Statistical and Nonlinear Physics Diesel cycle Expectation values Interacting fermions
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Abstract:	We consider the toy model of quantum Diesel cycle without temperature constructed from non-interacting fermions, which are trapped in a one-dimensional box. The work and energy extracted from the cycle are by changing the expectation value of Hamiltonian. We analytically calculated the efficiency of the cycle and efficiency at maximum work as a function of compression ratio. We found that the efficiency of the engine depends on both compression ratio and cut-off ratio. In contrast, the efficiency at the maximum work can be written as a function of the compression ratio only. Moreover, we calculate the Clausius relation of the cycle. The degree of the irreversibility of the cycle depends only on the cut-off ratio. We also study the relation between power and efficiency of the cycle. The power output is also studied as the function of the compression ratio. It is found that for a given value of the cutoff ratio, the dimensionless power output decreases as the compression ratio increases.
URI:	https://link.springer.com/article/10.1140%2Fepjb%2Fe2020-10217-0 (https://link.springer.com/article/10.1140%2Fepjb%2Fe2020-10217-0) http://hdl.handle.net/123456789/3210 (http://hdl.handle.net/123456789/3210)
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