

Complexity in the stepwise ideal gas Carnot cycle

Francesco di Liberto*

*INFN and INFN, Sezioni di Napoli, Dipartimento di Scienze Fisiche,
Università di Napoli "Federico II", Via Cintia, I-80126 Napoli, Italy*

Abstract

A stepwise Carnot cycle is performed by means of N small weights (here called dw 's), which are first added and then removed from the piston of the vessel containing the gas. The size of the dw 's affects the entropy production. The work performed by the gas can be found as increase of the potential energy of the dw 's. We identify each single dw and thus evaluate its raising, i.e., its increase in potential energy. In such a way we find how the energy output of the cycle is distributed among the dw 's. The distribution depends on the removing process we choose. Since these processes are $N!$, there are $N!$ distributions of the raisings of the dw 's; it is therefore worthwhile to investigate how to find $n_\varepsilon = n(\varepsilon)$ the number of the dw 's whose energy increase is ε .
© 2002 Elsevier Science B.V. All rights reserved.

PACS: 05.70.Ln; 65.40.Gr

Keywords: Complexity; Carnot; Thermodynamic cycle
