

ENTROPY PRINCIPLE AND MOMENTUM EXCHANGE ON A DISCRETE MOMENTUM SPACE

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ABSTRACT. The generally accepted momentum distribution of a system of moving molecules is the one maximizing the Boltzmann-Gibbs entropy; it generalizes the wellknown Maxwell Hypothesis. But even so this momentum distribution remains a theoretical postulate, which cannot be examined directly by laboratory physics. Computer experimentation allows a wayout. For a special Hamiltonian defined on a discrete momentum space, for which the theoretically postulated momentum distribution is related to the excited energy levels of the harmonic oscillator from quantum mechanics, two different dynamics based on different concepts of momentum exchange are realized in computer experimentation, yielding different empiric momentum distributions, although the Hamiltonian remains the same.

Key words: Momentum distribution determined by the Hamiltonian, optimizer of the Boltzmann-Gibbs entropy, Entropy Principle, dynamics based on different concepts of momentum exchange, empiric momentum distribution, excited energy levels of the harmonic oscillator. 2000 Mathematics Subject Classification. Primary : 37M05, 82B10, 82C22, 82C80