

Contribution Title: NONEQUILIBRIUM STATISTICAL MECHANICS OF  
(AN)HARMONIC CHAINS WITH SELF-CONSISTENT  
RESERVOIRS

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We derive an integral representation (a la Feynman-Kac) for the correlation functions of harmonic and anharmonic chains of oscillators with self-consistent reservoirs [1,2,3]. The integral formalism is inspired on a previous work for the simpler case of a nonconservative system coupled to thermal baths at the same temperature [4], and it is suitable for the study of the correlations time decay, as well as the correlations behavior in the steady state. For the harmonic case, we give a new proof for the finitude of thermal conductivity in the steady state [1,3], and for inhomogeneous systems, with graded masses or interparticle interactions, we show the absence of thermal rectification [5]. For the anharmonic models, we study (performing a non rigorous analysis) a system with soft (bounded) anharmonicity considering different constant couplings between each site and its reservoir: we make small the coupling constant for the inner sites in order to infer the behavior of the system as it is connected to two thermal baths at the boundaries only [2].

- [1] Emmanuel Pereira and Ricardo Falcao, Phys. Rev. E 70, 046105 (2004)
- [2] Emmanuel Pereira and Ricardo Falcao, Phys. Rev. Lett. 96, 100601 (2006)
- [3] R. Falcao, A. Francisco Neto, and E. Pereira, Theor. Math. Phys. 156, 1081 (2008)
- [4] P. A. F. da Veiga, M. O'Carroll, E. Pereira, and R. Schor, Commun. Math. Phys. 220, 377 (2001)
- [5] Emmanuel Pereira and Humberto C. F. Lemos, Phys. Rev. E 78, 031108 (2008)