Economic inequality: a moral and political issue that statistical physics may help to address

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The emergence of economic inequality constitutes a major moral and political issue, which is attracting growing interest in different contexts. Also within the mathematics and physics community various models have been recently formulated to describe the evolution in time of income and wealth distributions based on a myriad of microscopic (individual) interactions. In fact, statistical physics provides appropriate methods and tools for the understanding and explanation of mechanisms leading to such collective phenomena and may hence help to address the concern. We here review and discuss some models we have developed over the last few years within this research stream.

The models take the form of systems of nonlinear differential equations of the kinetic discretized-Boltzmann kind. Society is described as an ensemble of individuals divided into a finite number of income classes; the interactions between the individuals represent direct money exchanges, taxation (with tax rates depending on the income classes of the involved individuals) and redistribution processes (possibly weighted according to a means-tested welfare system). Tax evasion to different extents is taken into consideration too. We study the behavior of the Gini index as indicator of economic inequality and we also introduce an indicator of social mobility. In particular, we check the correlation of the latter with economic inequality. Our findings confirm that the correlation is negative in agreement with empirical evidence.

[l] M.L. Bertotti, G. Modanese, Complexity **21**, 89 (2016).

[2] M.L. Bertotti, G. Modanese, Int. J. of Design & Nature and Ecodynamics **11**, 620 (2016).

[3] M.L. Bertotti, G. Modanese, Eur. Phys. J. ST **225**, 1945 (2016).

[4] M.L. Bertotti, G. Modanese, J. Econ. Interact. Coord. in print; Online First (2016).