

# Lorenzian analysis of infinite Poissonian populations and the phenomena of Paretian ubiquity

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The Lorenz curve is a universally-calibrated statistical tool measuring quantitatively the distribution of wealth within human populations. We consider infinite random populations modeled by inhomogeneous Poisson processes defined on the positive half-line – the randomly scattered process-points representing the wealth of the population-members (or any other positive-valued measure of interest such as size, mass, energy, etc.). For these populations the notion of "macroscopic Lorenz curve" is defined and analyzed, and the notion of "Lorenzian fractality" is defined and characterized. We show that the only non-degenerate macroscopically observable Lorenz curves are power-laws manifesting Paretian statistics – thus providing a universal "Lorenzian explanation" to the ubiquitous appearance of Paretian probability laws in nature.

[1] I. Eliazar, *Physica A* **386**, 318-334 (2007).