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Non-exponential models of dynamics of biological communities and the Principle of minimal of Tsallis information gain. Preliminary report.

In order to model prebiological evolution, Varga and Szathmary (1997), Szathmary (2006) proposed a model of a community composed of sub-exponential (parabolic) population growth, described by the multi-dimensional non-linear system of ODEs. I show that this complex model can be reduced to a single ODE and then effectively solved. The current distribution of the individuals in the community provides minimum of the Tsallis information gain under appropriate constraint. Important informal corollaries may follow from the fundamental property of the Tsallis entropy being non-additive for independent subsystems. For sub-exponential systems, the information about two exhaustive independent subsystems is not enough to obtain the information about the whole system. Hence, the general methodological principle, reductionism, may not work for such systems.

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