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NON-LINEAR BEHAVIORS IN THE DYNAMICS OF COMPLEX SYSTEMS WITH POTENTIAL ECONOMY APPLICATION. QUALITATIVE ANALYSIS FROM MULTI-FRACTAL PERSPECTIVE

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Abstract: *In a Schrödinger-type and Madelung-type scenarios for the description of complex economics system dynamics, SL(2R) symmetries are highlighted. The emergence of such symmetries has several consequences: the existence of analogic-type behavior as a gauge invariance of Riccati type as well as the existence of digital-type behavior through the spontaneous symmetry breaking of the same gauge invariance.*

When said symmetries are discussed in the context of economics dynamics, the individual reaction to market signals can be associated to period doubling and modulated dynamics (i.e. to the digital signals) while, the behaviors of large investors and of the State, through banking or monetary policies, can associated to the "complex economics system background" (i.e. analogical signals).

Moreover, the markets have a fractal/multi-fractal structure on the long term, being characterized by a "self-memory". The economic structures emphasize fluctuations but, they never reach the chaos state. Thus, a holographic approach on complex economics system dynamics (and, on economics complex economics systems) provides a valid and more natural perspective, compared to the standard approaches. Our research provides a qualitative insight of economics complex system dynamics, remaining a more rigorous study which reveals a quantitative analysis of financial fractal bubbles to be done in further research.

Keywords: Scale Relativity Theory, multifractal, Schrödinger type scenario, Madelung type scenario, Riccati type gauge

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