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# *A quantum formalism of dynamical systems*

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***Abstract***

Considering in this paper a *dynamical system* as a system of coupled first order dynamic differential equations, a quantum approach is presented for these kinds of systems. The quantum approach here developed by the author is an attempt to better understand complexity. In addition, it provides a way to state a mathematical parallelism between dynamical systems and physical systems, which are generally defined through systems of coupled second order dynamic differential equations.

The first step is to recall the Hamiltonian formalism of dynamical systems, as well as the corresponding Hamilton-Jacobi equation, from the previous article provided in this congress (*an analytical formalism of dynamical systems*). In the beginning, from the quantization rules stated in the Copenhagen formalism of quantum mechanics, a Schrodinger equation can be written for these systems. The quantization rules applied assume that the physical Planck's constant is here substituted by a value that must depend on each particular system, and whose value must represent the limitation of knowledge on the system.

The Schrodinger equation deduced is a first order partial differential equation defined on the complex field. In addition, the amplitude square of the wave function is demonstrated that holds the probability conservation law, such as a wave function must be interpreted.

From the Schrodinger equation a time-independent version is deduced when the system is autonomous. The application case is focused on the one-dimensional systems, concretely on the logistic function case. For this case the energy can be quantized when the singularities arisen at the critical points of the logistic function become continuous.

To end the paper the future lines of research are stated from the approach presented, and some assumptions are discussed, such as the value of the particular Planck's constants, or the relationship of this approach with other approaches.