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Role of Riemann's and Goldbach's hypotheses in the behaviour of complex systems: Introduction to the concept of "sciances"

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Abstract

The authors have already established a bi univocal correspondence between Riemann zeta functions and dynamic processes under the control of integro-differential operator of non-integer complex order. We recall that the Riemann zeta function can then be related to hyperbolic geodesics whose angles at the boundary are determined by the real part of the power laws that define the Riemann series. It is suggested that Riemann's conjecture can be reduced to a geometrical phase transition with a reduction of the parameter of order resulting from the combination of a pair symmetries associated with a quasi-self similarity of geodetics. The well-known relationship with the set of prime numbers must be considered as the result of the local existence of stationary 'state' in the dynamics. The work is focused on the 'non stationary' behaviour of Riemann zeta function. It is shown that the main characteristic of the dynamics of complex systems may be associated to a hybridizing between a pair of states and/or processes able to give a geometrical status to the concept of the time and equally to the concept of energy. It is based on the mirror properties of complementary zeta function. It is shown also that the set of prime numbers, which controls the transitions between 'states', is the simplest form of the complexity. This analysis suggests the existence of a mathematical relationship between Riemann's and Goldbach's hypothesis. Such relationship would be the base of an extension of the principles of the science for the analysis of the complexity. According to previous proposal we name this extension that enlarges the principles of the science : sciance with 'a'.

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