

## On the continuity of temporal domain in dynamic phenomena

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### Abstract

According to the principle that all dynamic phenomena can be conceptually assimilated to a stochastic process whose configuration varies according to the infinite factors of its causal “*universe*”, it is possible to conclude that the differential succession of its states designs the complete evolution of its “*space—time*”, understood as a generalisation of the concept of physical time. In the realm of the deterministic paradigm, each state of a stochastic process constitutes the unique consequence of the simultaneous realisation of the factors that form its universe. In other words, it considers that every process is such that its space--time is isomorphic with its structural behaviour defined by the class of causal curves that mathematically define its trajectory. As an alternative to the hypothesis of behaviour explainable in terms of classical mechanics, the aleatorist paradigm considers that phenomena evolve according to a constructive non--equilibrium dynamic which, as a consequence of its fundamental property of self--organisation, generates new complex structures that can only be formalised in the context of temporal irreversibility within the system. From a historical point of view, attempts at a theoretical treatment of phenomena that evolve according to a continuous succession in the domain of time proposed a conceptual structure with two lines of development: one in the field of physics and the other in mathematics. The present work attempts an exclusively mathematical--epistemological solution of time as a complete, compact, dense and convex ideal set.

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