

## **Temporal Logic and Philosophy of Cyclic Non-deterministic World**

The cyclicity or circularity of time are often postulated in connection with the repeated, symmetrical changes that some or all objects of the considered universe undergo. We encounter these sorts of changes in experience and then we model them in a scientific framework. The constantly recurring configurations of stars and planets, the circular rotation of the Earth, the constantly changing same four seasons, and the recurring stages of plant and animal life - all these phenomena support the ideas of cyclic or circular time. Calendars and clocks are commonly used tools to measure such temporal courses. Temporal cyclicity and circularity is postulated in some historical theories, in sociology, economics, and computer science. Finally, it is also found in modern physical theories which respect the recent confirmation of the accelerated expansion of the universe, which is explained by the existence of *dark energy*.

The idea of circularity of time is related to the position of temporal determinism. The notion of cyclic time, however, can be combined with indeterminism as long as time is branching. Our venture is to formally combine selected versions of cyclicity and selected versions of non-determinism, while referring our motivations and results to the history of these concepts in the field of philosophy. The versions of cyclic and branching time considered herein will also bring new results from the point of view of modern logic and formal philosophy, as well as with regards to the explication of some temporal concepts present in Western ancient, modern, and contemporary philosophy.