Relearchers apply dynamics system theory to predator-prey interactions

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European scientists advanced an important field of mathematics describing the behaviour of numerous physical and biological systems.

Dynamical systems theory (DST) is a branch of mathematics devoted to describing the behaviour of complex physical and biological systems that change with the passage of time. In fact, the state of a dynamical system at any time is described by a fixed mathematical rule.

The fundamental utility of DST is that one may clearly state the immediate future state or possible states of a system based on the present state using the rule. When only one possible future state exists, the system is deterministic; when more than one possibility exists, the system is stochastic or random.

DST is relevant to many different fields including economics, biology and astrophysics. It has recently been applied to modelling athletic performance, human development, predator-prey dynamics and even limb regeneration in insects.

In DST, the so-called state space is defined as an n-dimensional vector space (similar to a three-dimensional (3D) Cartesian space) that describes the state of the system at any given time. Using the evolution law, one may determine the next state of all parameters.

Bifurcation theory describes the situation when a small perturbation in a parameter produces a large (qualitative) change in the system's behaviour.

European researchers initiated the Quribius project to address certain as yet unexplored topics in this field. Among the important Quribius project results, scientists produced a wealth of new bifurcation diagrams resulting from a specific bifurcation and carried out an exhaustive study of another type of dynamical system subjected to various perturbations.

Given the widespread application of DST, mathematical advances achieved by the Quribius team in describing dynamical systems should have important impact on many fields.EU-funded scientists advanced an important field of mathematics describing the behaviour of numerous physical and biological systems.

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