A periodic prey-predator system

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Abstract

In a paper appeared in 1926 [1], Volterra presented his prey-predator model. He analyzed the system in the plane and he drew the now famous phase portrait having a global center around the equilibrium. Although Volterra dealt with an autonomous system, at the end of his paper he proposed the study of the non-autonomous case: "Side by side with the general theory, we may make various special inquiries. Thus, for example, we may suppose the coefficient of increase of the species to have an annual period, a supposition tending to establish a law of forced fluctuations superposed on the free fluctuations of the biological association considered."

In other words, seasonal effects lead to replace the parameters of the system by time-dependent functions of period one year. In the last fourty years several results on the periodic prey-predator system have been obtained, showing that this system can have an intricate dynamics. In this talk I will discuss some of the known results together with some open questions.

References

[1] V. Volterra, Fluctuations in the Abundance of a Species considered Mathematically, Nature 118, 558–560 (1926)