Delayed differential equation with non-constant delay in biology

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Abstract

Differential equations with delayed argument have numerous applications in biology, like e.g. in immunology, whether of epidemiology. These equation has the form

\[ \frac{dx}{dt} = f(x(t), x(t - \tau)) \]

where the set \( X \) of values of function \( x \) may be also multidimensional.

We shall present the applications of more general equations i.e. equations of the form

\[ \frac{dx}{dt} = F(x_t) \]

where \( F \) is defined on function space and \( x_t : (-r, 0] \to X \) is defined by the formula

\[ x_t(s) = x(t + s) \].

The examples of application of such equations will be presented. To such equations the classical method of steps cannot be used.

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