

## On Mackey-Glass delay equation with variable coefficients

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During the last few decades it has been recognized that equations with delay is a more adequate tool for describing various models of mathematical biology than equations without delay. For example, the equation with delay (Mackey-Glass equation)

$$\frac{dN}{dt} = \frac{rN_\tau}{1 + N_\tau^\gamma} - bN,$$

was applied to model white blood cells production. Here  $N(t)$  is a density of mature cells in blood circulation, the function  $\frac{rN_\tau}{1 + N_\tau^\gamma}$  modeled the blood cell reproduction, the time lag  $N_\tau = N(t - \tau)$  described the maturational phase before blood cells are released into circulation, the mortality rate  $bN$  was assumed to be proportional to the circulation. This equation was introduced to explain the oscillations in numbers of neutrophils observed in some cases of chronic myelogenous leukemia.

Various aspects of autonomous Mackey-Glass equation and some similar models now are well studied. We will consider in this talk nonautonomous Mackey-Glass equation and discuss for this equation the following questions: positiveness and boundedness of solutions, persistence and extinctions conditions, stability and oscillations.

We also discuss some other nonlinear delay models of Mathematical Biology.

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- [1] L. Berezansky, E. Braverman, *Comput. Math. Appl.*, **51**, 1 (2006).
  - [2] L. Berezansky, E. Braverman, L. Idels, *Math. Comput. Modeling*, **40**, 13(2004).