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Systems of nonlinear delay integral equations modelling population growth in a periodic environment

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Abstract: In this paper we study the existence and uniqueness of positive and periodic solutions of nonlinear delay integral systems of the type

$$x(t) = \int_{t-\tau_1}^{t} f(s, x(s), y(s))dsy(t) = \int_{t-\tau_2}^{t} g(s, x(s), y(s))ds$$

which model population growth in a periodic environment when there is an interaction between two species. For the proofs, we develop an adequate method of sub-supersolutions which provides, in some cases, an iterative scheme converging to the solution.

Keywords: nonlinear integral equations, monotone methods, population dynamics, positive solutions
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