

Abstract

This work is devoted to the existence of positive nontrivial solutions for a second-order nonlinear boundary value problem posed on the positive half-line. The problem stems from epidemiology and combustion theory. The positive nonlinearity depends on the solution and its derivative and may exhibit a singularity at the origin. It satisfies general polynomial growth conditions. New existence results of multiple positive solutions are proved using recent fixed point theorems on cones in Banach spaces. Examples with numerical computations illustrate the applicability of the existence theorems. Comparisons with existing results are provided