EXISTENCE AND NONEXISTENCE OF POSITIVE SOLUTIONS FOR A SYSTEM OF NONLINEAR SINGULAR FRACTIONAL DIFFERENTIAL EQUATIONS

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Abstract. In this paper, we establish sufficient conditions for the existence and nonexistence of positive solutions to the following nonlinear fractional differential system

\[
\begin{cases}
D^\alpha u(t) + a(t)f(t,u,v) = 0 \quad \text{in } (0,1), \\
D^\beta v(t) + b(t)g(t,u,v) = 0 \quad \text{in } (0,1), \\
u(0) = u(1) = u'(0) = 0, \\
v(0) = v(1) = v'(0) = 0,
\end{cases}
\]

(P)

where \(2 < \alpha, \beta \leq 3\), \(a, b \in C((0,1),[0,\infty))\) and the functions \(f, g\) belong to \(C([0,1] \times [0,\infty) \times [0,\infty], [0,\infty))\) and satisfy some appropriate conditions. Our analysis relies on Krasnoselskii fixed point theorem. Some examples are given to illustrate our results.


Keywords and phrases: Nonlinear fractional differential system, positive solution, Green’s function, fixed point theorem.

REFERENCES


