Su, Hua; **Wei, Zhongli**; **Xu, Fuyi**

The existence of positive solutions for nonlinear singular boundary value system with p-Laplacian. (English) Zbl 1111.34020

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Summary: We study the existence of positive solutions for the following nonlinear singular boundary value with p-Laplacian

$$\begin{cases} (\varphi_p(u')) + a(t)f(u(t)) = 0, & 0 < t < 1, \\ \alpha\varphi_p(u(0)) - \beta\varphi_p(u'(0)) = 0, & \gamma\varphi_p\big(u(1)\big) + \delta\varphi_p\big(u'(1)\big) = 0, \end{cases}$$

with $\varphi_p(s) = |s|^{p-2}s$, $p > 1$ and f is a lower semi-continuous function. By using the fixed-point theorem of cone expansion compression of norm type, the existence of positive solutions and of infinitely many positive solutions is obtained.

MSC:

34B16 Singular nonlinear boundary value problems for ordinary differential equations
34B18 Positive solutions to nonlinear boundary value problems for ordinary differential equations
34B15 Nonlinear boundary value problems for ordinary differential equations

Keywords:

p-Laplacian operator; singular boundary value problem; positive solution

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