

Continuum of one-sign solutions of one-dimensional Minkowski-curvature problem with nonlinear boundary conditions

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Abstract

In this work, we investigate the continuum of one-sign solutions of the nonlinear one-dimensional Minkowski-curvature equation $-\big(u'/\sqrt{1-\kappa u'^2}\big)'=\lambda f(t,u), \quad t \in (0,1)$ with nonlinear boundary conditions $u(0)=\lambda g_1(u(0)), u(1)=\lambda g_2(u(1))$ by using unilateral global bifurcation techniques, where $\kappa>0$ is a constant, $\lambda>0$ is a parameter $g_1, g_2: [0, \infty) \rightarrow (0, \infty)$ are continuous functions and $f: [0,1] \times [-\frac{1}{\sqrt{\kappa}}, \frac{1}{\sqrt{\kappa}}] \rightarrow \mathbb{R}$ is a continuous function. We prove the existence and multiplicity of one-sign solutions according to different asymptotic behaviors of nonlinearity near zero.

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