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A fourth-order BVP of Sturm-Liouville type with asymmetric unbounded nonlinearities.
(English summary)


Summary: “We obtain an existence and location result for the fourth-order boundary value problem of Sturm-Liouville type

\[ u^{(iv)}(t) = f(t, u(t), u'(t), u''(t), u'''(t)), \quad \text{for } t \in [0, 1] \]
\[ u(0) = u(1) = A, \]
\[ k_1u'''(0) - k_2u''(0) = 0, \]
\[ k_3u'''(1) + k_4u''(1) = 0, \]

where \( A \in \mathbb{R} \), \( f: [0, 1] \times \mathbb{R}^4 \rightarrow \mathbb{R} \) is a continuous function and \( k_i \in \mathbb{R} \) (\( i = 1, 2, 3, 4 \)) are such that \( k_1, k_3 > 0 \) and \( k_2, k_4 \geq 0 \). We assume that \( f \) satisfies a one-sided Nagumo-type growth condition which allows an asymmetric unbounded behavior on the nonlinearity. The arguments make use of an a priori estimate on the third derivative of a class of solutions, the lower and upper solutions method and degree theory.”

{For the entire collection see MR2307322 (2007k:34004)}

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