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Existence results for a model of nonlinear beam on elastic bearings. (English) Zbl 0965.74030

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Summary: We study the existence of solutions of the nonlinear fourth-order equation of Kirchhoff type $u^{(iv)} - m(\int_0^1 |u'(x)|^2 dx)u'' + f(x,u) = 0$ under nonlinear boundary conditions, which models the deformations of beams on elastic bearings.

MSC:

74K10 Rods (beams, columns, shafts, arches, rings, etc.)
74G25 Global existence of solutions for equilibrium problems in solid mechanics (MSC2010)

Keywords:

variational methods; critical point; functional; minimax theorem; necessary and sufficient condition for existence of solutions; Kirchhoff equation; nonlinear beam; nonlinear fourth-order equation; nonlinear boundary conditions; elastic bearings

Full Text: DOI

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