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一类非线性悬臂梁方程解的存在性

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Existence of solution to a class of nonlinear cantilever beam equations

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- 摘要
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摘要 考察了1类非线性悬臂梁方程,在力学上,这类方程描述了1端固定,另1端自由的弹性梁的形变,本文中方程的特点是非线性项含有未知函数的三阶导数. 通过使用方程的分解技巧和Leray—Schauder不动点定理建立了4个存在定理. 主要结论表明只要非线性项在某个有界集上的“高度”是适当的,这类方程至少有1个解或者正解.

关键词: 非线性常微分方程 两点边值问题 解和正解 存在性 不动点定理

Abstract: The existence of solution is considered for a class of nonlinear cantilever beam equations.In mechanics,the class of equations describes deformation of the elastic beam whose one end is fixed and the other is free.The character of this equation is that the nonlinear term contain third derivative of unknown function.By using of the decomposition of equation and the Leray-Schauder fixed point theorem,four existence theorems are established.The main results show that the class of equations has at least one solution or positive solution provided the "height" of nonlinear tem is appropriate on a bounded set.

Key words: nonlinear ordinary differential equation two-point boundary value problem solution and positive solution existence fixed point theorem

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