EXISTENCE OF POSITIVE SOLUTIONS OF NEUMANN BOUNDARY VALUE PROBLEM VIA A CONVEX FUNCTIONAL COMPRESSION-EXPANSION FIXED POINT THEOREM

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Abstract. This paper is devoted to study the existence of positive solutions of second-order boundary value problem
\[-u'' + Mu = h(t)f(t, u), \quad t \in (0, 1)\]
with Neumann boundary conditions
\[u'(0) = u'(1) = 0,\]
where \(M > 0, f \in C([0, 1] \times \mathbb{R}^+, \mathbb{R}^+), h(t)\) is allowed to be singular at \(t = 0\) and \(t = 1\). The arguments are based only upon the positivity of the Green’s function and the fixed point theorem of cone expansion and compression of convex function type.

Key Words and Phrases: Neumann BVP, positive solutions, cone, fixed point theorem.

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References

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