

MULTIPLE SOLUTIONS FOR A DISCRETE NONLINEAR BOUNDARY VALUE PROBLEM VIA CRITICAL POINT THEORY

PASQUALE CANDITO

ABSTRACT. The aim of my talk is to point out several results concerning the existence and multiplicity of solutions for the following problem

$$(P_{\lambda}^{f,q}) \begin{cases} -\Delta(\phi_p(\Delta u_{k-1})) + q_k |u_k|^{p-2} u_k = \lambda f(k, u_k), & k \in [1, N], \\ u_0 = u_{N+1} = 0, \end{cases}$$

where, N is a fixed positive integer, $[1, N]$ is the discrete interval $\{1, \dots, N\}$, $f : [1, N] \times \mathbb{R} \rightarrow \mathbb{R}$ is a continuous function, $\Delta u_{k-1} = u_k - u_{k-1}$ is the forward difference operator, $q_k \in \mathbb{R}_0^+$ for all $k \in [1, N]$, $\phi_p(s) := |s|^{p-2}s$, $1 < p < +\infty$, and $\lambda \in \mathbb{R}^+$. The approach is based on recent critical point theorems.

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(P. Candito) DIPARTIMENTO DI INFORMATICA, MATEMATICA, ELETTRONICA E TRASPORTI, FACOLTÀ DI INGEGNERIA, UNIVERSITÀ DEGLI STUDI MEDITERRANEA DI REGGIO CALABRIA, VIA GRAZIELLA (FEO DI VITO), 89100 REGGIO CALABRIA (ITALY)

E-mail address: pasquale.candito@unirc.it

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