

1135-39-778

John R. Graef* (john-graef@utc.edu), Department of Mathematics, University of Tennessee at Chattanooga, Chattanooga, TN, and **S. Heidarkhani, L. Kong** and **M. Wang**. *Existence of solutions to a discrete fourth order boundary value problem.*

Criteria are established for the existence of at least two nontrivial solutions to the discrete fourth order boundary value problem

$$\begin{cases} \Delta^4 u(t-2) - \alpha \Delta^2 u(t-1) + \beta u(t) = f(t, u(t)), & t \in [1, N]_{\mathbb{Z}}, \\ u(-1) = \Delta u(-1) = 0, & u(N+1) = \Delta^2 u(N) = 0, \end{cases}$$

where $N \geq 1$ is an integer, $\alpha, \beta \geq 0$, and $f : [1, N]_{\mathbb{Z}} \times \mathbb{R} \rightarrow \mathbb{R}$ is continuous in the second argument. Applications of the results to a related eigenvalue problem are also presented. The proofs are mainly based on the variational method and the classic mountain pass lemma of Ambrosetti and Rabinowitz. Examples are included to illustrate the applicability of the results. (Received September 14, 2017)