Frequent Oscillatory Solutions of a Nonlinear Partial Difference Equation

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Abstract: This paper is concerned with a class of nonlinear delay partial difference equations with variable coefficients, which may change sign. By making use of frequency measures, some new oscillatory criteria are established.

Keywords: partial difference equations; frequency oscillatory; frequency measures; nonlinear.

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1 Introduction

Let $Z$ be the set of integers, $Z[k, l] = \{i \in Z | i = k, k + 1, \ldots, l\}$ and $Z[k, \infty) = \{i \in Z | i = k, k + 1, \ldots\}$.

In [1], authors considered oscillations of the partial difference equation with several nonlinear terms of the form

$$u_{m+1,n} + u_{m,n+1} - u_{m,n} + \sum_{i=1}^{h} p_i(m, n) |u_{m-k_i,n-l_i}|^{\alpha_i} \text{ sgn} u_{m-k_i,n-l_i} = 0,$$

where $m, n \in Z[0, \infty), P_i(m, n) \geq 0 (i = 1, 2, \cdots, h)$ and

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