

Oscillation Criterion for Generalized Euler Difference Equations

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Abstract

I would like to present new results in the field of generalized Euler difference equations and speak about the paper Oscillation criterion for generalized Euler difference equations. The major part of this paper is formed by the proof of the main theorem. During my studies I analyze the Euler type half-linear difference equation with bounded and asymptotically periodic coefficients. The main goal of my work was to prove an oscillation criterion that complements a large number of previously known oscillation criteria. It is already proved that the Euler-type equation with positive coefficients is conditionally oscillatory. There are also already identified the corresponding oscillation constants which are given by the coefficients of the equation. In our work we extended the results for the coefficients from more general classes and identify the corresponding oscillation constants.

By using the Sturmian theorem we obtain that any non-zero solution of the general half-linear difference equation has either infinitely many generalized zeros or none in a neighborhood of infinity and we can divide considered equations into two types: oscillatory and non-oscillatory equations. We use this fact and work with the generalized adapted Riccati transformation together with known auxiliary results. To illustrate the fact that the presented criterion is new even for linear equations with periodic coefficients, we finish this paper with examples of simple equations whose oscillatory properties do not follow from previously known criteria.

References

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