

Refined discrete regular variation and its applications

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We introduce a new class of the so-called regularly varying sequences with respect to an auxiliary sequence, and state its properties. This class, on one hand, generalizes regularly varying sequences. On the other hand, it refines them and makes it possible to do a more sophisticated analysis in applications. We show a close connection with regular variation on time scales; thanks to this relation, we can use the existing theory on time scales to develop refined discrete regular variation. We reveal also a connection with generalized regularly varying functions.

As an application, we study asymptotic behavior of solutions to linear difference equations; we obtain generalization and extension of known results.

The theory also yields, as a by-product, a new view on the Kummer type test for convergence of series, which generalizes, among others, Raabe's test and Bertrand's test.