

Regularly varying sequences and second-order difference equations of Emden-Fowler type

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An asymptotic analysis of positive solutions of second-order nonlinear difference equation

$$(EF) \quad \Delta(p_n |\Delta x_n|^{\alpha-1} \Delta x_n) = q_n |x_{n+1}|^{\beta-1} x_{n+1}, \quad \alpha > \beta > 0$$

where $p = \{p_n\}$, $q = \{q_n\}$ are positive real-value sequences, will be presented. It is shown that with the help of discrete regular variation, considering the equation (EF), with p, q being regularly varying sequences. complete information can be acquired about the existence of all possible strongly increasing and strongly decreasing regularly varying solutions of this equation and their accurate asymptotic behavior at infinity.