

Asymptotics of families of solutions of nonlinear difference equations

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Imme van den Berg

Institutions: University of Évora

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Abstract

One method to determine the asymptotics of individual solutions of a difference equation is by solving an associated asymptotic functional equation. Here we study the behaviour of the solutions in an asymptotic neighbourhood of such individual solutions. We identify several types of attraction and repulsion, which range from almost orthogonality to almost parallelness. Necessary and sufficient conditions for these types of behaviour are given.

Keywords: Difference equations, asymptotics, stability, rivers, non-standard analysis, change of scale

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