Asymptotic Dynamics of a Difference Equation with a Parabolic Equilibrium

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Abstract

The aim of this work is the study of the asymptotic dynamical behaviour, of solutions that approach parabolic fixed points in difference equations. In one dimensional difference equations, we present the asymptotic development for positive solutions tending to the fixed point. For higher dimensions, through the study of two families of difference equations in the two and three dimensional case, we take a look at the asymptotic dynamic behaviour. To show the existence of solutions we rely on the parametrization method.

1 Introduction and Main Results

In studying difference equations, one interesting problem is to know the asymptotic dynamical behaviour, of the positive solutions that approach equilibrium points. This question naturally arises, for instance, when describing applications in biological or economical systems. See [10,18,22,23,32,35], for instance. In particular, how popula-

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