ON REPELLING CYCLES AND CHAOTIC SOLUTIONS OF DIFFERENCE EQUATIONS WITH RANDOM PARAMETERS

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We consider difference equations with right-hand sides depending at each moment not only on the value at the preceding moment but also on a parameter that takes random values in a given set Ω. For this probabilistic model, we study various dynamic scenarios, which are in a certain way different from scenarios of deterministic models and give a more comprehensive presentation of the processes in real physical systems. We derive conditions for the existence of attracting and repelling cycles of length $k \geqslant 1$ that hold for all values of the random parameter and conditions that hold with probability one. We also derive conditions under which the solutions are chaotic with probability one. It is shown that the chaotic solutions exist in the case where either the equation with random parameters has no cycles or all the cycles are repelling with probability one.

Keywords: difference equations with random parameters, attracting and repelling cycles, chaotic trajectory.

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