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Piecewise-Defined Difference Equations with Every Solution Eventually Periodic: Open Problem.

We consider piecewise-defined autonomous and nonautonomous difference equations of the form

$$x_{n+1} = f_n(x_n, x_{n-1}, \dots, x_{n-k}), \quad n = 0, 1, \dots,$$

where $k \in 0, 1, \dots$, f_n is piecewise defined and $f_n : D^{k+1} \rightarrow D$, $D \subset \mathbf{R}$, whose behavior of solutions is such that every solution is eventually periodic. We ask, "Why?" in most circumstances and "Why not?" in a few cases. This behavior of having every solution in D eventually periodic may occur in one of the following two settings:

- (i) certain conditions on the parameters of the equation are present;
- (ii) under all conditions on parameters of the equation.

We dedicate this talk to E.A. Grove and G. Ladas of the University of Rhode Island who asked the same question but specifically with regard to reciprocal max-type difference equations. (Received August 23, 2015)