Papaschinopoulos, Garyfalos; Schinas, John

**Criteria for an exponential dichotomy of difference equations.** (English) Zbl 0693.39001

Czech. Math. J. 35(110), No. 2, 295-299 (1985).

Consider the system of linear difference equations (1) $x(n+1) = A(n)x(n)$, where A(n) is a $k \times k$ invertible matrix for $n \in N$ such that (2) $|A(n)| \leq M$ for $n = 1, 2, 3, ...$; $M \geq 1$. The entries $a_{ij}(n)$ of A(n) are real functions. The authors prove the following propositions. Proposition 1: Suppose that (1) has an exponential dichotomy. Then there exist constants $0 < \theta < 1$, $T > 0$, $T \in N$ such that $|x(n)| \leq \theta \sup\{|x(u)| : |u-n| \leq T,\ u, n \in N,\ n \geq T\}$. Proposition 2: Suppose that there exist constants $T \geq 1$, $T \in N$, and $0 < \theta < 1$ such that $|x(n)| \leq \theta \sup\{|x(u)| : |u-n| \leq T,\ u, n \in N,\ n \geq T\}$. Then (1) has an exponential dichotomy. Proposition 3: Suppose that A(n) is a $k \times k$ bounded upper triangular and invertible matrix for all $n \in N$. Then (1) has an exponential dichotomy if and only if the corresponding diagonal system $x(n+1) = diag(\alpha_{11}(n), ..., \alpha_{kk}(n))x(n)$ has an exponential dichotomy.

**MSC:**

39A10 Additive difference equations



**Keywords:**

system of linear difference equations; exponential dichotomy

**Full Text:** EuDML

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