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On uniform stability for some systems of difference equations

The system of difference equations will be called ψ-uniformly stable on the interval $[0,\infty)$ if there exist a constant $M>0$ such that for any solution x and all $n \geqslant s \geqslant 0$ the inequality holds

$$\|\psi^{-1}(n)x(n)\| \leqslant M\|x(s)\|, \tag{1}$$

where ψ is the function from $N(n_0)$ into $(0,\infty)$.

We consider a perturbed nonlinear system of difference equations of the form

$$Y(n+1) = A(n)Y(n) + F(n, Y(n), TY(n)), \tag{2}$$

where A denotes the matrix $k \times k$, T is the continuous operator and the function $F : \mathbb{N}(n_0) \times \mathbb{R}^k \times \mathbb{R}^k \to \mathbb{R}^k$.

In the paper several new sufficient conditions for the ψ-stability of perturbed system (2) are given.

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