dr hab. Małgorzata Migda
dr Małgorzata Zbąszyniak
dr inż. Zenon Zbąszyniak
Institute of Mathematics, Poznań University of Technology

On Lipschitz stability for some systems of difference equations

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

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

and a linear system

$$X(n+1) = A(n)X(n), \tag{2}$$

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

The zero solution of system of difference equations will be called uniformly Lipschitz stable, if there exists $M > 0$ and $\delta > 0$ such that

$$\|x(n, n_0, x_0)\| \leqslant M\|x_0\|, \tag{3}$$

where $\|x_0\| < \delta$ and $n \in N(n_0)$.

In the paper several new sufficient conditions for the Lipschitz stability of system of difference equations are given.

Prezentowane wyniki badań, zrealizowane w ramach tematu nr PB-43-081/15DS, zostały sfinansowane z dotacji na naukę przyznanej przez Ministerstwo Nauki i Szkolnictwa Wyższego.