REFLECTIVE FUNCTION FOR LINEAR IMPULSIVE PERIODIC DIFFERENTIAL EQUATION

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In our report we consider reflective function for leaner impulsive matrix periodic differential equation with bilinear main part [1]

$$dX/dt = A(t)X - XB(t) + \sum_j [D_j]\delta(t - t_j)X + F_\delta(t), \qquad (1)$$

where denote $F_\delta(t) = F(t) + \sum_j \widetilde{F}_j \delta(t - t_i)$, $[D_j]X = D_j X \widetilde{D}_j$, $\delta(t - t_j)$ is Dirac function. The equation (2) is called periodic with period $T = 2w$ or T-periodic if the matrix functions $A(t)$, $B(t)$, $F(t, X(t))$ are periodic with period T and there is a number p such that $D_{j+p} = D_j$, $\widetilde{D}_{j+p} = \widetilde{D}_j$, $t_{j+p} = t_j + T$, for all $j \in \mathbb{N}$. At the point $t = t_j$ the matrix function has a jumping $X(t_j^+) - X(t) = D_j X(t_j) \widetilde{D}_j$. Following [1] we can introduce the reflective function for equation (1)

$$\mathbb{F}(t, X) = \mathbb{F}(t)X, \tag{2}$$

where $\mathbb{F}(t) = [U_0^{-t}][U_0^t]^{-1} = [U_t^0]^2$ is reflective operator, $\mathbb{F}(-w) = [U_0^{2w}]$ is the monodromy operator of equation (1). In equivalent vector space $\mathbb{R}^{nm}$ this operator corresponding to the reflective matrix $\mathcal{F}(t) = \underset{A}{U}{}_0^{-2t} \oslash (\underset{B}{U}{}_0^{-2t})^\top$. $\mathcal{F}(-w) = \underset{A}{U}{}_0^{2w} \oslash (\underset{B}{U}{}_0^{2w})^\top$ is monodromy matrix of equivalent vector equation. Thus the reflective operator-function has the form $\mathbb{F}(t, X) = \underset{A}{U}{}_0^{-t} (\underset{A}{U}{}_0^{t})^{-1} X (\underset{B}{U}{}_t^{0})^{-1} \underset{B}{U}{}_{-t}^{0} = \underset{A}{U}{}_{2t}^{0} X \underset{B}{U}{}_0^{2t} = [U_0^{-2t}]X$, where

$$\underset{A}{U}{}_0^{t} = \underset{A}{\Omega}{}_{t_i}^{t} \left(\prod_{j=i}^{1} D_j \underset{A}{\Omega}{}_{t_{i-1}}^{t_j} \right), \quad \underset{B}{U}{}_t^{0} = \left(\prod_{j=1}^{i} \underset{B}{\Omega}{}_{t_j}^{t_{j-1}} \widetilde{D}_j \right) \underset{B}{\Omega}{}_t^{t_i},$$

$$\underset{A}{U}{}_t^{0} = \left(\prod_{j=1}^{i} \underset{A}{\Omega}{}_{t_j}^{t_{j-1}} D_j^{-1} \right) \underset{A}{\Omega}{}_t^{t_i}, \quad \underset{B}{U}{}_0^{t} = \underset{B}{\Omega}{}_{t_i}^{t} \left(\prod_{j=i}^{1} \widetilde{D}_j^{-1} \underset{B}{\Omega}{}_{t_{i-1}}^{t_j} \right).$$

The properties of reflactive function of impulsive equations have been considered.

References. 1. Chiricalov V.A. // Int. J. Nonlinear Phenomena in Complex Systems. 2005. Vol. 8, no. 2. P. 121–133. **2.** Mironenko V.I. Reflective function and investigation of manydimentional differential systems. Gomel: Gomel state university, 2004. **3.** Yu.S. Bogdanov // Abstract of Third scientific session of the Institute of Applied Mathematics of Tbilisi State University. Tbilisi, 1971. Vol. 4. P. 26–30.