

THE NECESSARY AND SUFFICIENT CONDITIONS ON THE WELL-POSEDNESS OF THE INITIAL PROBLEM FOR A CLASS OF LINEAR SYSTEMS OF GENERALIZED ORDINARY DIFFERENTIAL EQUATIONS

Besarion Anjaparidze

e-mail: besarion.anjaparidze305@ens.tsu.edu.ge

Department of Mathematics, Faculty of Exact and Natural Sciences,
Ivane Javakhishvili Tbilisi State University,
University St.2, Tbilisi 0177, Georgia

In the present paper we investigate the well-posedness for the initial problem for the system of linear so called generalized ordinary differential equations

$$dx = dA(t) + df(t), \quad t \in [a, b] \quad (1.1)$$

$$x(t_0) = c_0 \quad (1.2)$$

where $A = (a_{ik})_{i,k=1}^n : I \rightarrow R^{n \times n}$ and $f = (f_i)_{i=1}^n : I \rightarrow R^n$ are respectively, continuous the matrix- and vector-functions with bounded total variation components on I . $t_0 \in I$, $c_0 \in R^n$ and $I = [a, b] \subset R$ is some closed interval, non-degenerate into a point.

Necessary and sufficient (as well effective sufficient) conditions are established on the well-posedness of the Cauchy problem for linear systems of continuous from the left generalized ordinary differential equations.

References

- [1]. M. T. Ashordia: On the correctness of linear boundary value problems for systems of generalized ordinary differential equations. Georgian Math. J. 1(1994), No. 4, 343–351.
- [2]. M. Ashordia: Criteria of correctness of linear boundary value problems for systems of generalized ordinary differential equations. Czechoslovak Math. J. 46 (121) (1996), No. 3, 385–404.
- [3]. M. Ashordia: Lyapunov stability of systems of generalized ordinary differential equations. Comput. Math. Appl. 50 (2005), No. 5-6, 957–982.
- [4]. M. Ashordia: The Initial Problem for Linear Systems of Generalized Ordinary Differential Equations, Linear Impulsive and Ordinary Differential Systems. Numerical Solvability. Mem. Differ. Equ. Math. Phys. 78 (2019), 1-162.
- [5]. M. Ashordia: The General Boundary Value Problems for Linear Systems of Generalized Ordinary Differential Equations, Linear Impulsive Differential and Ordinary Differential Systems. Numerical Solvability. Mem. Differ. Equ. Math. Phys. 81 (2020), 1-184.
- [6]. M. Ashordia: On the necessary and sufficient conditions for the convergence of the difference schemes for the general boundary value problem for the linear systems of ordinary differential equations. Math. Bohem. 146, No. 3, 333-362 (2021).
- [7]. Sh. Gelashvili and I. Kiguradze. On Multi-Point Boundary Value Problems for Systems of Functional Differential and Difference Equations. Mem. Differential Equations Math. Phys. 5 (1995), 1-113.