

On the initial value problem for functional-differential equations

András Rontó

Brno, Czech Republic

We consider the initial value problem for a linear functional differential system of the general form

$$\begin{aligned} u'_k(t) &= (l_k u)(t) + q_k(t), & t \in [a, b], \quad k = 1, 2, \dots, n, \\ u_k(\tau) &= c_k, & k = 1, 2, \dots, n, \end{aligned}$$

where $-\infty < a \leq \tau \leq b < \infty$, $n \in \mathbb{N}$, $l = (l_k)_{k=1}^n : C([a, b], \mathbb{R}^n) \rightarrow L_1([a, b], \mathbb{R}^n)$ is an arbitrary bounded linear mapping, $\{c_1, c_2, \dots, c_n\} \subset \mathbb{R}$, and $q = (q_k)_{k=1}^n : [a, b] \rightarrow \mathbb{R}^n$ are Lebesgue integrable functions. Some new and, in a sense, optimal constructive unique solvability conditions are obtained. The question on the monotonous dependence of the solution on the forcing terms and some generalisations are also discussed.