On the costruction of solution of the linear boundary value problem of the system of linear functional differential equations

Bedřich Půža

Brno, Czech Republic

For linear boundary value problem

$$x'(t) = p(x)(t) + q(t), \quad l(x) = c_0$$

on closed interval $I \subset \mathbb{R}$, where linear operator $p\colon C(I;\mathbb{R}^n) \to L(I;\mathbb{R}^n)$ is a so-called strongly bounded, linear functional $l\colon C(I;\mathbb{R}^n) \to \mathbb{R}^n$ is bounded, $q \in L(I;\mathbb{R}^n)$ and $c_0 \in \mathbb{R}^n$, a method of the construction of its solution is described via sequences of solutions of associated simpler linear boundary value problems.

Conditions are extrapolated for the applicability of the method of successive approximations in a general case as well as in a range of special cases, the stability of the aforementioned method is proven, and procedures are illustrated by problems solved in Maple program.

Acknowledgement

The research was supported by the Czech Science Foundation, Projects: GA16-03796S.

2010 Mathematics Subject Classification: 34B05, 34K28.

References

[1] Bellen, A., Zennaro, M., *Numerical methods for delay differential equations*. 1. Oxford: OUP Oxford, 2013.

[2] Bobalová, M.,Novotná, V., The Use of Functional Differential Equations in the Model of the Meat Market with Supply Delay. In: *Procedia - Social and Behavioral Sciences*. Elsevier, 2015, **213**, 74–79.

[3] Kiguradze, I., *An initial value problem and boundary value problems for systems of ordinary differential equations. Vol. I: Linear theory*. 1. Tbilisi: Metsniereba, 1997.

[4] Kiguradze, I., Půža, B., On boundary value problems for systems of linear functional differential equations. *Czechoslovak Math. J*. Praha, 1997, **47**(2), 341–373.

[5] Kiguradze, I., Půža,B., *Boundary value problems for systems of linear functional differential equations*. Brno: Masaryk University, 2003.

[6] Maňásek, L., On constructing a solution of a boundary value problem for functional differential equations. In: *Proceedings of Equadiff 11*. Bratislava: Comenius University Press, 2007, 237–244.

[7] Novotná, V., The Impact of the Inflation and Unemployment Values from the Previous Period on the Phillips Curve. In: *The 7th International Scientific Conference "Business and Management 2012". Selected papers*. Vilnius, Lithuania: VGTU Publishing House Technika, 2012, 147–155.

[8] Varysová, T., Novotná, V., Solution of Dynamical Macroeconomic Model Using Modern Methods. *Journal of Eastern Europe Research in Business and Economics*. IBIMA Publishing, 2015, **2015**(1), 1–10.