

## On a functional differential equation

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### Abstract

© 2017, Pleiades Publishing, Ltd. Conditions for the existence and uniqueness of a solution to a problem for a functional differential equation are presented. A special case of this equation is a functional differential equation derived previously by the authors for the distribution density of the brightness of light in interstellar space in the case of several clouds uniformly distributed in the equatorial plane of the Galaxy and having different optical densities.

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### Keywords

existence theorem, functional differential equation, uniqueness of solution

### References

- [1] N. P. Evlampiev, A. M. Sidorov, and I. E. Philippov, "On a generalization of Ambartsumyan's equation," *Uch. Zap. Kazan. Univ., Ser. Fiz.-Mat. Nauki* 156 (4), 25–30 (2014).
- [2] N. P. Evlampiev, V. S. Mokeichev, and I. E. Philippov, "Density of distribution of light intensity in the case of absorbing clouds," *Uch. Zap. Kazan. Univ., Ser. Fiz.-Mat. Nauki* 154 (4), 126–129 (2012).
- [3] V. A. Ambartsumyan, *Scientific Works* (Izd. Akad. Nauk Arm. SSR, Yerevan, 1960), Vol. 1 [in Russian].
- [4] T. Kato and J. B. McLeod, "The functional-differential equation  $y'(x) = ay(\lambda x) + by(x)$ ," *Bull. Am. Math. Soc.* 77, 891–937 (1971).
- [5] L. Fox, D. F. Mayer, J. R. Ockendon, and A. B. Tayler, "On a functional differential equation," *J. Inst. Math. Appl.* 8, 271–307 (1971).
- [6] J. Carr and J. Dyson, "The matrix functional differential equation  $y'(x) = Ay(\lambda x) + By(x)$ ," *Proc. R. Soc. Edinburgh, Sect. A* 74, 165–174 (1976).
- [7] G. I. Rusakov, "Fluctuations in brightness of the MilkyWay," *Uch. Zap. Leningr. Univ., Ser. Mat. Nauk* 18, 53–79 (1949).
- [8] V. S. Mokeichev and N. P. Evlampiev, "Solution of a differential-difference equation on the semi-axis," *Izv. Vyssh. Uchebn. Zaved., Mat.*, No. 4, 44–47 (1991).
- [9] T. Carleman, *Les fonctions quasi-analytiques* (Paris, Gauthier-Villars, 1926) [in French].