Arabadzhyan, L. G.

On a conservative integral equation with two kernels. (English. Russian original) Zbl 0914.45003
Math. Notes 62, No. 3, 271-277 (1997); translation from Mat. Zametki 62, No. 3, 323-331 (1997).

Summary: We study the solvability of the integral equation

$$f(x) = g(x) + \int_0^\infty T_1(x-t)f(t)dt + \int_{-\infty}^0 T_2(x-t)f(t)dt, \qquad x \in \mathbb{R},$$

where $f \in L_1^{\mathrm{loc}}(\mathbb{R})$ is the unknown function and g, T_1, and T_2 are given functions satisfying the conditions

$$g \in L_1(\mathbb{R}), \quad 0 \le T_j \in L_1(\mathbb{R}), \qquad \int_{-\infty}^\infty T_j(t)dt = 1, \quad j = 1, 2.$$

Most attention is paid to the nontrivial solvability of the homogeneous equation

$$s(x) = \int_0^\infty T_1(x-t)s(t)dt + \int_{-\infty}^0 T_2(x-t)s(t)dt, \quad x \in \mathbb{R}.$$

MSC:

45E10 Integral equations of the convolution type (Abel, Picard, Toeplitz and Wiener-Hopf type)

Cited in **4** Documents

Keywords:

conservative integral equation; two kernels; local integrability; nontrivial solvability

Full Text: DOI

References:

[1] N. B. Engibaryan and L. G. Arabadzhyan, "On some factorization problems for integral operators of convolution type,"Differentsial'nye Uravneniya [Differential Equations],26, No. 8, 1442–1452 (1990). · Zbl 0712.45005

[2] A. A. Arutyunyan, "On factorization of an integral operator," in:Differential and Integral Equations [in Russian], Erevan (1979), pp. 43–48.

[3] N. B. Engibaryan and A. A. Arutyunyan, "Integral equations with difference kernels on a half-line and nonlinear functional equations,"Mat. Sb. [Math. USSR-Sb.],97, No. 5, 35–58 (1975). · Zbl 0324.45005

[4] L. G. Arabadzhyan and N. B. Engibaryan, "Convolution equations and nonlinear functional equations," in:Itogi Nauki i Tekhniki, Matem. Analiz [in Russian], Vol. 22, VINITI, Moscow (1984), pp. 175–244. · Zbl 0568.45004

[5] L. G. Arabadzhyan, "On the conservative Wiener-Hopf equation,"Izv. Akad. Armyan. SSR Ser. Mat. [Soviet J. Contemporary Math. Anal.],16, No. 1, 65–80 (1981). · Zbl 0461.45002

[6] R. Bellman and K. Cooke,Differential-Difference Equations, New York (1963). · Zbl 0105.06402

[7] A. N. Kolmogorov and S. V. Fomin,Elements of Theory of Functions and Functional Analysis [in Russian], Nauka, Moscow (1981); English translation:Introductory Real Analysis, Dover, 1975.

[8] L. G. Arabadzhyan, "On an integral equation of transfer theory in inhomogeneous media,"Differential'nye Uravneniya [Differential Equations],23, No. 9 (1987). · Zbl 0635.45009

[9] S. Karlin, "On the renewal equation,"Pacific J. Math.,5, No. 2, 229–257 (1955). · Zbl 0067.34902

[10] W. Rudin,Functional Analysis, McGraw-Hill, New York (1973). · Zbl 0253.46001

[11] L. G. Arabadzhyan, "On the factorization of conservative integral Wiener-Hopf operators,"Mat. Zametki [Math. Notes],46, No. 1, 3–10 (1989). · Zbl 0724.45002