

Generalized convolutions and the integral equations of the convolution type

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Abstract: This article gives six new generalized convolutions of the integral transforms of Fourier type, and investigates a class of integral equations of convolution type by using the constructed convolutions. Namely, the explicit solutions in $L^1(\mathbb{d})$ of a class of integral equations of convolution type are obtained. © 2010 Taylor & Francis.

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References:

- Churchill, R.V., (1941) Fourier Series and Boundary Value Problems, p. 206. , McGraw-Hill, New York
- Brown, J.W., Churchill, R.V., (2006) Fourier Series and Boundary Value Problems, p. 384. , 7th ed., McGraw-Hill Science/Engineering/Math, Springer, Berlin, Heidelberg, New York, London
- Vilenkin, N.Y., Matrix elements of the indecomposable unitary representations for motion group of the Lobachevsky's space and generalized Mehler-Fox (1958) Dokl. Akad. Nauk. USSR, 118 (2), pp. 219-222. , (in Russian)
- Kakichev, V.A., On the convolution for integral transforms (1967) Izv. ANBSSR, Ser. Fiz. Mat, 2, pp. 48-57. , (in Russian)
- Kakichev, V.A., On the matrix convolutions for power series (1990) Izv. Vuzov. Mat, 2, pp. 53-62. , (in Russian)

- Kakichev, V.A., Thao, N.X., Tuan, V.K., On the generalized convolutions for Fourier cosine and sine transforms (1998) East-West Jour. Math, 1 (1), pp. 85-90
- Britvina, L.E., Generalized convolutions for the Hankel transform and related integral operators (2007) Math. Nachr., V, 280 (9-10), pp. 962-970
- Britvina, L.E., A class of integral transforms related to the Fourier cosine convolution (2005) Integ. Trans. Spec. Funcs., V, 16 (5-6), pp. 379-389
- Thao, N.X., Khoa, N.M., On the convolution with a weight-function for the cosine- Fourier integral transform (2004) Acta Math. Vietnam, 29 (2), pp. 149-162
- Thao, N.X., Khoa, N.M., On the generalized convolution with a weight-function for Fourier, Fourier cosine and sine transforms (2005) Vietnam J. Math, 33 (4), pp. 421-436
- Thao, N.X., Khoal, N.M., On the generalized convolution with a weight function for the Fourier sine and cosine transforms (2006) Integral Transforms Spec. Funct., 17 (9), pp. 673-685
- Thao, N.X., Hai, N.T., (1997) Convolution For Integral Transforms and Their Applications, , Computer Center of the RAS, Moscow
- Thao, N.X., Tuan, T., On the generalized convolution for I-transform (2003) Act. Math. Vietnamica, 18, pp. 135-145
- Thao, N.X., Tuan, V.K., Hong, N.T., Integral transforms of Fourier cosine and sine generalized convolution type (2007) Int. J. Math. Math. Sci, 17, pp. 1-11
- Tuan, V.K., Integral transform of Fourier type in a new class of functions (1985) Dokl. Akad. Nauk BSSR, 29 (7), pp. 584-587. , (in Russian)
- Srivastava, H.M., Tuan, V.K., A new convolution theorem for the Stieltjes transform and its application to a class of singular integral equations (1995) Arch. Math, 64, pp. 144-149
- Al-Musallam, F., Tuan, V.K., A class of convolution transforms (2000) Frac. Cal. Appl. Anal, 3 (3), pp. 303-314
- Gohberg, I.S., Feldman, I.A., (1971) Convolution Equations and Projection Methods For their Solutions, , Nauka, Moscow, (in Russian)
- Sneddon, I., (1951) Fourier Transforms, , McGraw-Hill, New York, Toronto, London
- Titchmarsh, E.C., (1986) Introduction to The Theory of Fourier Integrals, , Clarendon Press, New York
- Kakichev, V.A., (1997) Polyconvolution, , Taganrog, TRTU
- Rudin, W., (1991) Functional Analysis, , McGraw-Hill, New York
- Bochner, S., Chandrasekharan, K., (1949) Fourier Transforms, , Princeton University Press, Princeton
- Cho, P.S., Kuterdem, H.G., Marks II, R.J., A spherical dose model for radio surgery plan optimization (1998) Phys. Med. Bio, 43, pp. 3145-3148
- Garcia-Vicente, F., Delgado, J.M., Peraza, C., Experimental determination of the convolution kernel for the study of the spatial response of a detector (1998) Med. Phys, 25, pp. 202-207
- Garcia-Vicente, F., Delgado, J.M., Rodriguez, C., Exact analytical solution of the convolution integral equation for a general profile fitting function and Gaussian detector kernel (2000) Phys. Med. Biol, 45 (3), pp. 645-650. , (6)
- Hochstadt, H., (1973) Integral Equations, , John Wiley & Sons, Inc., New York