

# Operational Calculi for Boundary Value Problems

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Till recently, there had not been any systematic development of operational calculi intended for solution of Boundary Value Problems (BVPs) for ordinary and partial linear differential operators. The lack of any direct operational calculi using the Mikusiński's scheme may be explained by the lack of appropriate convolutions. In the author's book [1] a plenty of such convolutions are found. But, nevertheless, the systematic development of corresponding operational calculi faces with specific difficulties, connected with the abundance of divisors of zero. In [2] an one-dimensional operational calculus for non-local Cauchy problems is developed. The extension of one-dimensional operational calculi to multi-dimensional BVPs connected with some classes of linear partial differential operator, requires new convolutions for non-local BVPs for the square of the differentiation, found in [1]. A systematic development for the two-dimensional case is presented in [3]. Here the transition to the multi-dimensional case will be outlined.

**References.** [1] I. H. Dimovski. Convolutional Calculus. Kluwer, Dordrecht, 1990. [2] I. H. Dimovski. Nonlocal operational calculi. In Proc. Steklov Inst. of Math., 1995, Issue 3, 53-65. [3] I. Dimovski, M. Spiridonova. Computational Approach to Nonlocal Boundary Value Problems by Multivariate Operational Calculus, Math. Sci. Res. J., V. 9, No 12, 2005, 315-329