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THE MEASURE OF APPROXIMATION IN THE TWO DIMENSIONAL OPERATIONAL FIELD

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ABSTRACT. In this paper we present a measure of approximation for the approximate solution of equations with coefficients in the field $\mathcal{Q}(\mathcal{A})$ of operators of T. Ogata [**4**].

1. Operational calculus. Consider the algebraically closed subset $\mathcal{K}$ of the field of Mikusinski operators $\mathcal{F}$ with elements of the form

$$\sum_{i=i_0}^{\infty} h_i l^{\alpha i-\beta},$$

where h_i are complex numbers for $i_0 > -\infty$, $i = i_0, i_0+1, \dots$, α and β are rational numbers, and $\alpha > 0$.

Let $\mathcal{A}$ be the set of formal power series of a variable λ with coefficients in $\mathcal{K}$. With the usual addition and multiplication given by

$$PQ = \left\{ \sum_{\rho=0}^{\infty} \left(\sum_{\rho=\mu+\nu} \frac{\nu!\mu!}{(\rho+1)!} p_\nu q_\mu \right) \lambda^{\rho+1} \right\},$$

where

$$P = \left\{ \sum_{\nu=0}^{\infty} p_\nu \lambda^\nu \right\}, \qquad Q = \left\{ \sum_{\mu=0}^{\infty} g_\mu \lambda^\mu \right\},$$

(with $p_\mu, q_\nu \in \mathcal{K}$ for $\mu, \nu = 0, 1, \dots$) the ring $\mathcal{A}$ forms an integral domain without a unit element. The field of operators $\mathcal{Q}(\mathcal{A})$ is the quotient field of ring $\mathcal{A}$.

In the field of Mikusinski operators, $\mathcal{F}$, let us denote, as usual, by l the integral operator, by s the differential operator (recall that $l = s^{-1}$), and in $\mathcal{Q}(\mathcal{A})$ by L the integral operator and by S the differential operator (recall that $L = S^{-1}$).

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