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- Alexander G. Ramm

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- A. G. Ramm

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<tr><th>abstract</th><td>Let $(1) Rh=f$, $0\leq x\leq L$, $Rh=\int^L_0 R(x,y)h(y) dy$, where the kernel $R(x,y)$ satisfies the equation $QR=P\delta(x-y)$. Here Q and P are formal differential operators of order n and $m<n$, respectively, n and m are nonnegative even integers, $n>0$, $m\geq 0$, $Qu:=q_n(x)u^{(n)} + \sum^{n-1}_{j=0} q_j(x) u^{(j)}$, $Ph:=h^{(m)} +\sum^{m-1}_{j=0} p_j(x) h^{(j)}$, $q_n(x)\geq c>0$, the coefficients $q_j(x)$ and $p_j(x)$ are smooth functions defined on $\R$, $\delta(x)$ is the delta-function, $f\in H^\alpha(0,L)$, given. Here $\dot H^{-\alpha}(0,L)$ is the dual space to $H^\alpha(0,L)$ with respect to the inner product of $L^2(0,L)$. Under suitable assumptions it is proved that $R:\dot H^{-\alpha}(0,L) \to H^\alpha(0,L)$ is an isomorphism. Equation (1) is the basic equation of random processes estimation theory. Some of the results are generalized to the case of multidimensional equation (1), in which case this is the basic equation of random fields estimation theory. $\alpha:=\frac{n-m}{2}$, H^α is the Sobolev space. An algorithm for finding analytically the unique solution $h\in\dot H^{-\alpha} (0,L)$ to (1) of minimal order of singularity is</td></tr>
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