

Structure of fractional spaces generated by the two dimensional neutron transport operator

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Abstract: In this study, the structure of fractional spaces generated by the two-dimensional neutron transport operator A defined by formula $Au = \omega_1 \frac{\partial u}{\partial x} + \omega_2 \frac{\partial u}{\partial y}$ is investigated. The positivity of A in $C(R^2)$ and $L_p(R^2)$, $1 \leq p < \infty$ is established. The structure of fractional spaces generated by the operator A is studied. It is established that for any $0 < \alpha < 1$ and $1 \leq p < \infty$ the norms in the spaces $E_{\alpha,p}(L_p(R^2), A)$ and $E_\alpha(C(R^2), A)$, $W_p^\alpha(R^2)$ and $C^\alpha(R^2)$ are equivalent, respectively. The positivity of the neutron transport operator in Hölder space $C^\alpha(R^2)$ and Slobodeckij space $W_p^\alpha(R^2)$ is proved.

Keywords: neutron transport operator, positive operator, fractional spaces, Hölder spaces, Slobodeckij spaces

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