A Generalized Translation Operator Generated by the Sinc Function on an Interval

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Abstract—We discuss the properties of the generalized translation operator generated by the system of functions $\mathfrak{S} = \{(\sin k\pi x)/(k\pi x)\}_{k=1}^{\infty}$ in the spaces $L^q = L^q((0,1), v)$, $q \geq 1$, on the interval $(0,1)$ with the weight $v(x) = x^2$. We find an integral representation of this operator and study its norm in the spaces L^q, $1 \leq q \leq \infty$. The translation operator is applied to the study of Nikol'skii's inequality between the uniform norm and the L^q-norm of polynomials in the system $\mathfrak{S}$.

Keywords: generalized translation, sinc function, inequality of different metrics.

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