

**THE RANGE OF FINITE INTEGRAL TRANSFORMS  
ARISING FROM  $n$ -th ORDER SINGULAR  
SELF-ADJOINT DIFFERENTIAL OPERATORS**

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**Abstract**

This paper deals with a class of integral transforms arising from a singular self-adjoint differential operator

$$Ly := p_0(t) \frac{d^n y}{dx^n} + p_1(t) \frac{d^{n-1} y}{dx^{n-1}} + \cdots p_n(t) y, \quad -\infty \leq a < x < b \leq \infty,$$

where the  $p_k$  are complex-valued functions with  $n - k$  continuous derivatives on the open interval  $(a, b)$ , with  $p_0(t) \neq 0$  for any  $a < t < b$ .

The paper gives a characterization of the image of a function that has compact support (Paley-Wiener theorem) under this class of transforms. The characterization is obtained with no restriction on  $p_k$  other than what stipulated above.

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