On wavelet multiplier and Landau–Pollak–Slepian operators on $L^2(G, \mathbb{H})$

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Abstract
In this paper, we define the wavelet multiplier and Landau–Pollak–Slepian (L.P.S) operators on the Hilbert space $L^2(G^2, \mathbb{H})$, where G is a locally compact abelian topological group, and $\mathbb{H}$ is the quaternion algebra; Also, we will investigate some of their properties. In particular, we show that they are bounded linear operators, as well in Schatten p-class spaces, $1 \le p \le \infty$, and we determine their trace class.

1 Introduction

The representation of a function by simultaneous bandlimiting and timelimiting has been the concern of many researchers in their works, until to the 1960s, when the problem was solved by works of Henry Landau, Henry Pollack and David Slepian [12,13,16], they introduced the self-adjoint Landau–Pollak–Slepian (L.P.S.) operator on $L^2(\mathbb{R}^n)$. In 1999, He and Wong, introduced Wavelet multipliers operator on $L^2(\mathbb{R}^n)$ [11], which was generalized from Landau–Pollak–Slepian operator, they showed that the L.P.S. operator is in fact a wavelet multiplier operator; for more details see [17].

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