

## A novel wavelet transform in the quaternion quadratic-phase domain

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In this paper, we propose a novel integral transform coined as quaternion quadratic-phase wavelet transform (QQPWLT) by invoking the elegant convolution structure associated with the quaternion quadratic-phase Fourier transform. First, we explore some mathematical properties of the QQPWLT, including the orthogonality relation, inversion formula, reproducing kernel and some notable inequalities. Second, we study Heisenberg's uncertainty principles and the logarithmic uncertainty principle associated with the quadratic-phase wavelet transform in quaternion domain. We culminate our investigation by presenting some illustrative examples.

**Keywords:** Quaternion quadratic-phase Fourier transform; convolution; orthogonality; inversion; uncertainty principle.

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