# Fast Classical and Quantum Fractional Walsh Transforms

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The *fractional Fourier transform* (FRFT) is a one-parameter generalization of the classical Fourier transform. The FRFT was introduced in the nineteen-eighties and found many applications in signal processing. The time and spectral domains are both special cases of the fractional Fourier domain. They correspond to the 0th and 1st fractional Fourier domains, respectively. However, classical and quantum fractional Walsh transforms have been absent until now. In this paper we introduce the *classical and quantum fractional Walsh transforms* and develop corresponding fast algorithms.