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# A STUDY OF TWO-DIMENSIONAL PSEUDO-CHEBYSHEV WAVELETS AND THEIR APPLICATION TO FUNCTIONS OF HÖLDERS CLASS

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**Abstract:** In 2022, Shyam Lal, Susheel Kumar, and their collaborators introduced pseudo-Chebyshev wavelets in the context of one-dimension. Building on this foundation, the present study extends the framework to two dimensions. A two-dimensional pseudo-Chebyshev wavelet expansion is formulated and verified, and a novel algorithm is proposed for solving approximation problems. The method's effectiveness is demonstrated through illustrative examples and comparisons with standard Chebyshev wavelet methods. Error and convergence analyses are conducted for functions in the Hölder class, and the approximation error is estimated using generalized orthogonal projection operators. In this paper, we present several refinements of our current results, supported by illustrative examples that not only yield sharper bounds but also offer a more comprehensive and rigorous understanding of the underlying mathematical structure.

**Keywords and Phrases:** Pseudo-Chebyshev wavelets; Two-dimensional Pseudo-Chebyshev wavelets; Hölder class; Generalized orthogonal projection operator.

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