

ON THE DIRECT PATH PROBLEM OF  
 $s$ -ELEMENTARY FRAME WAVELETS

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**Abstract**

In this paper, we discuss the path-connectivity between two  $s$ -elementary normalized tight frame wavelets via the so-called direct paths. We show that the existence of such a direct path is equivalent to the non-existence of an atom of a  $\sigma$ -algebra defined over the defining sets of the corresponding frame wavelets, using a mapping defined by the natural translation and dilation operations between the sets. In particular, this gives an equivalent condition for the existence of a direct path between two  $s$ -elementary wavelets.