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On the nonexistence of compactly supported Sobolev prewavelets for box spline multiresolution analyses

We show that there do not exist any compactly supported prewavelets with respect to Sobolev seminorms for the multiresolution analysis is generated by box splines in $\mathbb{R}^d$ for $d \geq 2$. Neither do there exist compactly supported prewavelets with respect to the full norm, nor if we use one Sobolev norm to define the semiorthogonality and another for the Riesz basis property of the prewavelets. The case $d = 1$ is an exception, since it is already known that compactly supported univariate spline prewavelets exist for integer s. This is joint work with P. Oswald.