ON THE NONEXISTENCE OF COMPACTLY SUPPORTED AB SCALING FUNCTIONS FOR CERTAIN SHEAR GROUPS B

Abstract. In the area of one dimensional dyadic wavelets, the concept of an MRA has played quite a prominent role. Perhaps one of the more remarkable applications of the MRA construct is its use in the argument given by I. Daubechies to show that for any nonnegative integer n there is a compactly supported dyadic wavelet ψ such that all derivatives of ψ up to order n exist. This ψ is constructed by means of an MRA whose scaling function is also compactly supported and n times differentiable. It is interesting to ask whether the MRA concept can yield such useful results when applied to the area of AB composite wavelets, where B is a shear group. For instance, with B a shear group, one can ask whether there exists an AB MRA whose scaling function is compactly supported. We will show that for many shear groups B and many choices of A that the anwser is no, provided we also require either that φ satisfy a mild degree of smoothness or that φ satisfy a "finite filter type" condition.