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Title: Multiresolution analysis and Zygmund dilations

Abstract: Zygmund dilations are a group of dilations lying in between the standard product theory and the one-parameter setting: the Zygmund-dilation with two parameters (s,t) sends the 3-vector (x,y,z) to (sx, yt, stz) . The dyadic multiresolution analysis and the related dyadic-probabilistic methods have been very impactful in the modern product singular integral theory. However, multiresolution analysis has not been understood in the Zygmund dilation setting or in other modified product space settings. In this talk I will develop this missing dyadic multiresolution analysis of Zygmund type, and justify its usefulness by bounding, on weighted spaces, a general class of singular integrals that are invariant under Zygmund dilations. I provide novel examples of Zygmund weights and Zygmund kernels showcasing the optimality of the kernel assumptions for weighted estimates.

The talk is based on joint work with Kangwei Li, Henri Martikainen, and Emil Vuorinen.