THE BOUNDEDNESS OF MULTILINEAR CALDERÓN–ZYGMUND OPERATORS ON WEIGHTED AND VARIABLE HARDY SPACES

David Cruz-Uribe, OFS, Kabe Moen, and Hanh Van Nguyen

Abstract: We establish the boundedness of the multilinear Calderón–Zygmund operators from a product of weighted Hardy spaces into a weighted Hardy or Lebesgue space. Our results generalize to the weighted setting results obtained by Grafakos and Kalton [**18**] and recent work by the third author, Grafakos, Nakamura, and Sawano [**20**]. As part of our proof we provide a finite atomic decomposition theorem for weighted Hardy spaces, which is interesting in its own right. As a consequence of our weighted results, we prove the corresponding estimates on variable Hardy spaces. Our main tool is a multilinear extrapolation theorem that generalizes a result of the first author and Naibo [**10**].

2010 Mathematics Subject Classification: 42B25, 42B30, 42B35.

Key words: Muckenhoupt weights, weighted Hardy spaces, variable Hardy spaces, multilinear Calderón–Zygmund operators, singular integrals.