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Quarkonial frames of wavelet type - Stability and moment conditions

In this talk we are concerned with subatomic decompositions of function spaces, in the sense of Triebel. As an important special case, we consider quarkonial frames of piecewise polynomial functions.
Similar to the strategy of multilevel partition of unity methods, such frames are typically generated by the dyadic dilates and integer translates of a positive refinable function, multiplied with polynomials of any degree.
We show direct and inverse estimates for the respective approximation spaces with truncated refinement level and polynomial degree. As a consequence, appropriately weighted quark systems have the frame property in a range of Sobolev spaces.
We show that by applying a wavelet-type modification, one obtains quarkonial frames that are also stable in L_2. Moreover, such "quarklet" frames have moment properties which make them suitable for the compression of integral operators.
This talk is based on joint work with Stephan Dahlke (Philipps-University of Marburg) and Peter Oswald (Jacobs University Bremen).