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Phan Nguyen* (nnphan@nmsu.edu), Department of Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003. *Piecewise C^1 Biorthogonal Multiwavelets on $[-1, 1]$.*

A procedure is given for constructing biorthogonal multiwavelets from a family of biorthogonal multiscaling functions compactly supported on $[-1, 1]$. The scaling vectors and the associated multiwavelets are piecewise C^1 , symmetrical and possess approximation order three. The construction of scaling vectors is accomplished using fractal interpolation functions. The filters corresponding to scaling vectors possess certain properties which enable us to construct a new pair of biorthogonal scaling vectors and associated multiwavelets with different regularity and approximation order, related to the old ones by differentiation and integration. The new multiscaling functions and multiwavelets give rise to biorthogonal multiresolution analyses for the Sobolev space $H_0^2([0, 1])$. The work is motivated by potential numerical applications in differential equations. (Received September 13, 2011)