962-42-131 **Denise A Jacobs*** (jacobs@math.gatech.edu), School of Mathematics, Georgia Tech, Atlanta, GA 30332-0160. *Smoothness of Refinable Function Vectors.*

The construction of a multiwavelet basis in higher dimensions begins with a refinement equation, which is a system of functional equations of the form $f(x) = \sum_{k \in Z^d} c_k f(Ax - k)$. Here $f : R^d \to C^r$, A is a dilation matrix (an expansive matrix mapping Z^d into itself), and each c_k is an $r \times r$ complex matrix. A solution of such a system is called a refinable function vector. For applications, it is important to deterimine when the refinement equation has a solution with given properties, such as smoothness and linear independence of translates. We derive conditions which ensure the existence of an n-times continuously differentiable solution and discuss the global independence properties of the solution. (Received August 08, 2000)