Convergence rates of subdivision schemes associated with nonhomogeneous refinement equation

Song Li, Zhejiang University

The purpose of this paper is to investigate multivariate nonhomogeneous refinement equations of the form

$$\varphi(x) = \sum_{\alpha \in \mathbb{Z}^s} a(\alpha) \varphi(Mx - \alpha) + g(x), \; x \in \mathbb{R}^\sim,$$

where the vector of functions $\varphi = (\varphi_1, \ldots, \varphi_r)^T$ is unknown, $g$ is a given vector of compactly functions on $\mathbb{R}^\sim$, $a$ is a finitely supported sequence of $r \times r$ matrices called the refinement mask, and $M$ is an $s \times s$ integer matrix such that $\lim_{n \to \infty} M^{-n} = 0$. Our purpose is to consider the convergence rates of the subdivision schemes in Sobolev space $(W^k_p(\mathbb{R}^\sim))^\sim$, $(0 \leq k \leq \infty)$ and $(L_p(\mathbb{R}^\sim))^\sim$, $(0 < p \leq \infty)$ space associated with nonhomogeneous refinement equations mentioned above.