

# Supports and Local Linear Independence of Multivariate Refinable Functions

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We study supports of multivariate refinable functions associated with general dilation matrices  $M$ . In the univariate case, when  $M = 2$ , the support is always a closed interval. When  $M > 2$ , it is showed that the support of a refinable function equals to the attractor of an iterated function system under the assumption of local linear independence. We extend our study to the multivariate case. It is true that the support of a multivariate refinable function  $\phi$  with a general dilation matrix  $M$  and the support  $D$  of the mask is exactly equal to the attractor of the iterated function system  $T(M, D)$  under the assumption of local linear independence. So the local linear independence of multivariate refinable functions is required. A complete characterization for this local linear independence property is given by finite matrix products, strictly in terms of the refinement mask. A characterization of self-affine tilings is presented in terms of the existence  $L_2$  solutions of refinement equations.