Multivariate sampling-type expansions

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Approximation properties of expansions $\sum_k c_k \varphi(M^j \cdot -k)$ are studied, where M is a matrix dilation, c_k are sampled values of f, i.e. $f(M^{-j}k)$, or sampled values of an appropriate differential operator L, i.e. $Lf(M^{-j}\cdot)(k)$, or the integral averages of f near $M^{-j}k$. Error estimations in L_p-norm, $p \geqslant 2$, are given in terms of the Fourier transform of f. The approximation order depends on how smooth is f, on the order of Strang-Fix condition for φ and on M. Some special properties of φ are required, but the class of functions φ we consider is large enough (including compactly supported splines as well as band-limited functions). Periodic case is also discussed.