Shift invariant spaces $V(\Phi)$ of $L^2(\mathbb{R}^d)$ having a stable generator of length $n$ $\Phi = \{\varphi_1, \ldots, \varphi_n\}$ occur in many applications in sampling theory, wavelet theory and approximation theory.

Given a finite set of arbitrary functions $F = \{f_1, \ldots, f_m\}$ in $L^2(\mathbb{R}^d)$, and a fixed $n \in \mathbb{N}$, it is possible that the set $F$ does not belong to any space $V(\Phi)$ with a stable generator of length exactly $n$.

Therefore it is an important question if there exists an “optimal” space $V(\Phi)$ - in some sense relevant to the application - for the set $F$.

This is the problem that we will address in this talk. (Received September 29, 2002)