1012-42-118 **Akram Aldroubi*** (aldroubi@math.vanderbilt.edu), SC 1520, Department of Mathematics, Vanderbilt University, Nashville, TN 37240, and **Carlos Cabrelli** and **Ursula Molter**. *Best shift invariant space models.*

(A.Aldroubi, C.Cabrelli, D.Hardin, U.Molter)

Given a large set of experimental data $F = \{f_1, f_2, \ldots, f_m\} \subset L^2(\mathbf{R}^d)$, we determine a shift-invariant space V that can be generated by n generators or less, (where typically n is chosen to be small compared to m) that models the signals in "some" best way. In particular, we solve the following least squares problem:

$$V = \text{argmin}_{V' \in \mathcal{V}_n} \sum_{i=1}^{m} w_i \|f_i - P_{V'} f_i\|^2 \tag{1}$$

where $\mathcal{V}_n$ is the set of all shift-invariant spaces that can be generated by n generators or less, w_i are positive weights, and $P_{V'}$ is the orthogonal projection on V'.

This problem is motivated by applications involving large data sets (for example consider the problem of finding a shift-invariant space model for the collection of chest X-rays using data collected by a hospital during the last 10 years). (Received September 15, 2005)