

1107-42-258

**Sivaram K Narayan\*** ([sivaram.narayan@cmich.edu](mailto:sivaram.narayan@cmich.edu)), Department of Mathematics, Central Michigan University, Mount Pleasant, MI 48859. *Inverse Factor Poset Problem for Finite Frames.*

A *frame* in an  $n$ -dimensional Hilbert space  $H_n$  is a possibly redundant collection of vectors  $\{f_i\}_{i \in I}$  that span the space. A *tight* frame is a generalization of an orthonormal basis. We define the *factor poset* of a frame  $\{f_i\}_{i \in I}$  to be a collection of subsets of  $I$  ordered by inclusion so that nonempty  $J \subseteq I$  is in the factor poset if and only if  $\{f_j\}_{j \in J}$  is a tight frame for  $H_n$ . The *inverse factor poset problem* inquires when there exists a frame whose factor poset is some given poset  $P$ . We determine a necessary condition for solving the inverse factor poset problem in  $H_n$  which is shown to be sufficient for  $H_2$ . We address how factor poset structure is preserved under orthogonal projections. Furthermore, we discuss how many non-isomorphic factor posets are there for a fixed dimension  $n$  and number of vectors  $k$  and how large can these factor posets be. This is a joint work with Alice Chan, Martin Copenhaver, Logan Stokols, and Allison Theobald. (Received January 16, 2015)