983-43-469 **Peter G. Casazza*** (pete@math.missouri.edu), Department of Mathematics, University of Missouri, Columbia, MO 65211-4100, and **Manuel Leon** (mleon@math.missouri.edu), Department of Mathematics, University of Missouri, Columbia, MO 65211-4100. *Existence and Construction of Finite Frames with a given frame operator.*

Let S be a positive self-adjoint invertible operator on an N-dimensional Hilbert space H_N and let $M \geq N$. We give necessary and sufficient conditions on real sequences $a_1 \geq a_2 \geq dots \geq a_M \geq 0$ so that there is a frame $\{\varphi_n\}_{n=1}^{n=M}$ for H_N with frame operator S and $\|\varphi_n\| = a_n$, for all $n = 1, 2, \ldots M$. As a consequence, given any *frame operator* S as above, there is a set of equal norm vectors in H_N which have precisely S as their frame operator. A MATLAB toolbox implementing all results is freely distributed by the authors. (Received September 10, 2002)