Meeting: 1004, Bowling Green, Kentucky, SS 5A, Special Session on Advances in the Study of Wavelets and Multiwavelets

1004-43-203 **Troy Henderson*** (thenders@math.tamu.edu), 1707 Leona Drive, College Station, TX 77840, and **David R Larson** (larson@math.tamu.edu), 1105 Deacon Drive, College Station, TX 77845.

Causal Equivalence of Frames.

We say that two (ordered) frames $X = \{x_i\}_{i=1}^k$ and $Y = \{y_i\}_{i=1}^k$ for H with $\dim H = n$ and $k \geq n$ are *causally equivalent* if $y_i = \operatorname{span}\{x_1, \ldots, x_i\}$ and $x_i = \operatorname{span}\{y_1, \ldots, y_i\}$ for each $1 \leq i \leq k$. If we let $K = \mathbb{R}^k$ (or $K = \mathbb{C}^k$) be the range space of the analysis operators of such frames, then X is causally equivalent to Y if there exists an invertible lower triangular (with respect to the standard orthonormal basis for K) operator L such that $\theta_Y = L\theta_X$. With this defnition, every frame is causally equivalent to a Parseval frame. We obtain several characterization and optimality results under both the operator norm and the Hilbert-Schmidt norm for the class of frames that are causally equivalent a given frame. Finally, we use these results to define a generalization of the Classical Gram-Schmidt process to frames. (Received January 24, 2005)