Meeting: 999, Nashville, Tennessee, SS 2A, Special Session on Wavelets, Frames, and Sampling

999-42-220 **Bernhard G. Bodmann*** (bgb@math.uh.edu), 651 Philip G. Hoffman Hall, Dept. of Mathematics, Univ. of Houston, Houston, TX 77204, and **David K Hoffman**, **Donald J Kouri**, **Manos Papadakis** and **Qiyu Sun**. *An inhomogeneous uncertainty principle for digital low-pass filters.*

This paper introduces an inhomogeneous uncertainty principle for digital low-pass filters. The measure for uncertainty is a product of two factors evaluating the frequency selectivity in comparison with the ideal filter and the effective length of the filter in the digital domain, respectively. We derive a sharp lower bound for this product in the class of filters with finite effective length and show the absence of minimizers. We find necessary and certain sufficient conditions to identify minimizing sequences. When the class of filters is restricted to a given maximal length, we show the existence of an uncertainty minimizer. The uncertainty product of such minimizing filters approaches the infimum as the filter length increases. We examine the asymptotics and explicitly construct a sequence of finite-length filters with the same asymptotics as the sequence of finite-length minimizers. (Received August 23, 2004)