999-41-221 **Bernhard G Bodmann** (bgb@math.uh.edu), Department of Mathematics, University of Houston, Houston, UT 77204-3008, **David K Hoffman** (hoffman@ameslab.gov), Department of Chemistry, Iowa State University, Ames, IA 50011, **Donald J Kouri** (kouri@uh.edu), Department of Chemistry, Universiy of Houston, Houston, TX 77204-5003, and **Manos Papadakis*** (mpapadak@math.uh.edu), Department of Mathematics, University of Houston, Houston, TX 77204-3008. *Conversion between analog and digital domains revisited.* Preliminary report.

Most signals are assumed to be bandlimited, although they only have some decay in the frequency domain. The bandlimitedness assumption is necessary to secure faithful digitization. In order to deal with non-bandlimited signals we introduce the concept of essential bandwidth. Based on this concept we prove an approximate sampling theorem for functions whose essential frequency content resides within this bandwidth. The resulting sequence of samples is then used to reconstruct an approximation of the original function. This process introduces two types of errors: One due to the truncation of the Fourier transform of the function to the essential bandwidth and one due to aliasing. We will give estimates for both errors. (Received August 23, 2004)