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Jack Xin* (jxin@math.uci.edu), Department of Mathematics, UC Irvine, Irvine, CA 92697. *Ear Modeling, Auditory Transforms and Applications*. Preliminary report.

We present a class of nonlinear nonlocal ear models based on the macro and micro mechanics of the inner ear, and demonstrate their capabilities to model major nonlinear phenomena in hearing. We then design transforms of sound signals based on properties of model solutions. In particular, a class of orthogonal auditory transforms arise from equipping Fourier transform with ear characteristics. We show examples of signal processing applications such as denoising and sound amplification for the hearing impaired. (Received August 31, 2005)