BIOLOGICALLY-INSPIRED SIGNAL PROCESSOR USING LATERAL INHIBITION AND INTEGRATIVE FUNCTION MECHANISMS FOR HIGH INSTANTANEOUS DYNAMIC RANGE

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Abstract- This paper presents a biologically-inspired signal processor, which allows selective amplification of signals, and signal channeling mechanism to increase the contrast and sharpness of the perceived signals. The processor draws influence from lateral inhibition and integrative

function mechanisms of the human nervous system. The uniqueness of the proposed design is that it combines two intelligent signal transmission mechanisms of the human nervous system with desirable capabilities: 1) wide input bandwidth, and 2) high instantaneous dynamic range. The simulations results demonstrate that the proposed design can selectively amplify weak signals among four existing strong signals and suppress noise and spurs to expose and detect weak signals, which is 58 dB below the strong ones if 4096-point FFT is used.

Index terms*:* Biologically-inspired signal, signal processor, lateral inhibition, integrative function, selective amplification.