

A Passive Shared Element Analog Electrical Cochlea

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Abstract: We present a simplified model of the micromechanics of the human cochlea, realized with electrical elements. Simulation of the model shows that it retains four signal processing features whose importance we argue on the basis of engineering logic and evolutionary evidence. Furthermore, just as the cochlea does, the model achieves massively parallel signal processing in a structurally economic way, by means of shared elements. By extracting what we believe are the five essential features of the cochlea, we hope to design a useful front-end filter to process acoustic images and to obtain a better understanding of the auditory system.