Improving the Entropy Estimate of Neuronal Firings of Modeled Cochlear Nucleus Neurons

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In this correspondence information theoretical tools are used to investigate the statistical properties of modeled cochlear nucleus globular bushy cell spike trains. The firing patterns are obtained from a simulation software that generates sample spike trains from any auditory input. Here we analyze for the first time the responses of globular bushy cells to voiced and unvoiced speech sounds. Classical entropy estimates, such as the direct method, are improved upon by considering a time-varying and time-dependent entropy estimate. With this method we investigated the relationship between the predictability of the neuronal response and the frequency content in the auditory signals. The analysis quantifies the temporal precision of the neuronal coding and the memory in the neuronal response.

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