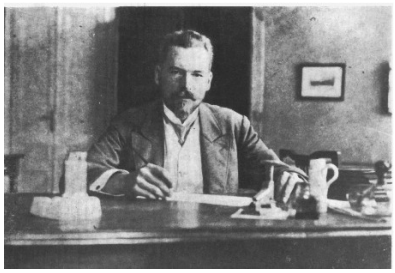

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Exploring ”inverse stochastic resonance” and nonstandard stochastic resonance with information-theoretic tools

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Some pacemaker neurons show a depression of their mean firing rate for intermediate noise amplitudes, which reminds the response enhancement known as “stochastic resonance” (SR). Even though its analogy with SR goes no further, this phenomenon has been termed “inverse stochastic resonance” (ISR). In a recent work, the ISR phenomenon -as well as its close relative “nonstandard SR” (or more properly, noise-induced activity amplification, NIAA)- have been shown to stem from the weak-noise quenching of the initial distribution, in bistable regimes where the metastable state has a larger attraction basin than the global minimum. To further illustrate the mechanism whereby the ISR and NIAA phenomena take place, we revisit the one-variable model that led to that conclusion, exploring it with information-theoretic tools.

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