

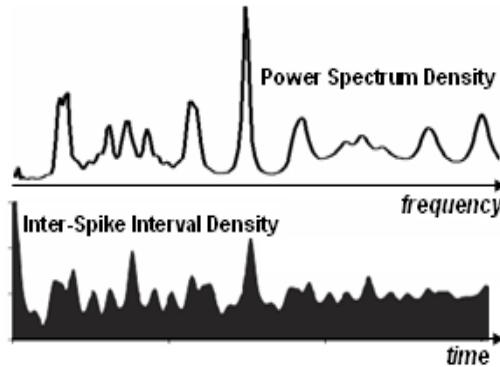
# THE RESEMBLANCE OF AN AUTOCORRELATION FUNCTION TO A POWER SPECTRUM DENSITY FOR A SPIKE TRAIN OF AN AUDITORY MODEL

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In Ref. [1] P. Cariani describes the results of the research into the complex auditory system's neural model consisting of hundreds neural elements. In that study the All-Order Interspike Interval Distribution (AOISID) was used, reported as a quantity "corresponding" to the autocorrelation function (ACF) of the cumulative spike train. In Ref. [2] we investigated the Power Spectrum Density (PSD) at the output of the relatively simple auditory system's neural model consisting of three neurons. For the similar input signal, we discovered the resemblance of our PSD to Cariani's AOISID (see the figure). In this work we develop an analytical approach to the AOISID calculation, and try to explain the discovered resemblance. The work is supported by RFBR (grant No. 11-02-01418-a).



[1] P. Cariani, *J. New Music Res.* **30**, 107 (2001).

[2] Yu. V. Ushakov and A. A. Dubkov, *Moscow University Physics Bulletin.* **65**(5), 372 (2010).