

Supplemental Information

Willy Wong

February 7, 2023

1 Simulations

The MATLAB Model of Auditory Periphery (MAP) and its earlier version, the Development System for Auditory Modelling (DSAM), as well as the Zilany-Bruce-Carney (ZBC) models were used to generate values of peak rate (PR), steady-state rate (SS) and spontaneous rate (SR) to compare with the derived inequality. Using default parameter settings in each of the models (configuration files are available for download), a comparison was made between MAP, DSAM and the two latest version of ZBC. In each case, adaptation was simulated at the unit's best frequency to a pure tone stimulation of length 200 ms with short ramps, and then averaged for 2000 runs before extracting out the values of SR, PR and SS. The simulations were carried out over increasing intensities until saturation of the response was observed at approximately 40 dB.

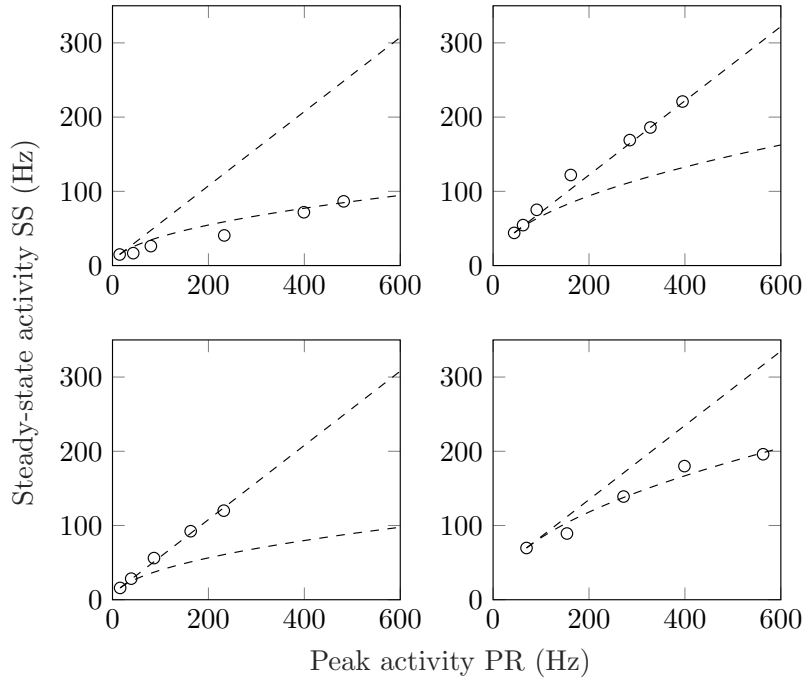


Figure 1: Steady-state (SS) versus peak activity (PR) simulated with the (a) MATLAB model of the auditory periphery (MAP), (b) Development System for Auditory Modelling (DSAM), (c) Zilany-Bruce-Carney 2018 model and (d) Zilany-Bruce-Carney 2014 model. The dotted lines show the predictions of the upper and lower bounds of the inequality.