Comments

Comment by Kohlrausch:

You showed a figure in the talk, in which the ERB values of the two different filter approaches (compressive gammachirp and double roex) were plotted as a function of frequency and level, and you pointed out that the ERB values derived from the two fits to the same data differed by up to a factor of two. Besides the fact that such a difference in numbers might cause some disturbance for researchers who are used to think in terms of ERBs to characterize the hearing system, and who base choices of component frequencies and the interpretation of behavioral data on these values, it also suggests the questions: What is the source of the bandwidth difference? Is there a difference in the two approaches in the amount of excitatory and inhibitory (suppressive) interaction between a notched-noise masker and a target?

Comment by Kollmeier:

As discussed in several of the last ISH meetings, the ERB is an inappropriate measure of "effective" bandwidth if filters with different shapes are to be compared. The ERB is simply the integral of the whole filter transfer function divided by the filter response at the center frequency. Thus, the ERB depends strongly on little details of the central lobe of the filter and does not reflect the filter behavior at more remote frequencies. More appropriate measures to compare filters are the Q10 or the BW90 (i.e., the bandwidth where 90% of the filter transfer function is included, see Kollmeier and Holube 1992).

Would you expect a closer coincidence of effective bandwidth between fitted roex and gammatone filters if you used an alternative measure of the bandwidth?

Kollmeier, B. and I. Holube (1992) Auditory filter bandwiths in binaural and monaural listening configurations. J. Acoust. Soc. Am. 92, 1889-1901.

Reply:

We agree that the ERB reflects primarily the width of the tip of the filter, and we agree that users need to be aware of this limitation when using the ERB as a summary of the auditory filter. We also agree that, in many cases, Q10 or BW90 might be a more appropriate measure of filter width. The figure below provides a comparison of the ERBs (circles), the BW90s (squares) and the Q10s (triangles) for the dRoex filter (solid lines) and the cGC filter (dashed lines), when the stimulus level is 50 dB SPL. The definition of the BW90 is "the bandwidth that encompasses 90% of the integrated area above and 90% of the integrated area below the maximum value of the respective filter characteristic." The figure shows that the BW90 and Q10 for the dRoex are comparable and about double the value of the ERB throughout the frequency range. The Q10 for the cGC is about double the ERB throughout the frequency range, but the BW90 is consistently smaller than the

Q10 for the cGC (closer to 1.6 times the ERB). As a result, the difference between the bandwidth of the dRoex and cGC filters is smaller when the measure is BW90, but a substantial difference between the two filters remains. The asterisks and dotted line show the ERB values published by Glasberg and Moore (1990) for the simple roex(p) filter (Patterson *et al.* 1982); they are very similar to the ERB values estimated for the dRoex in the current study.

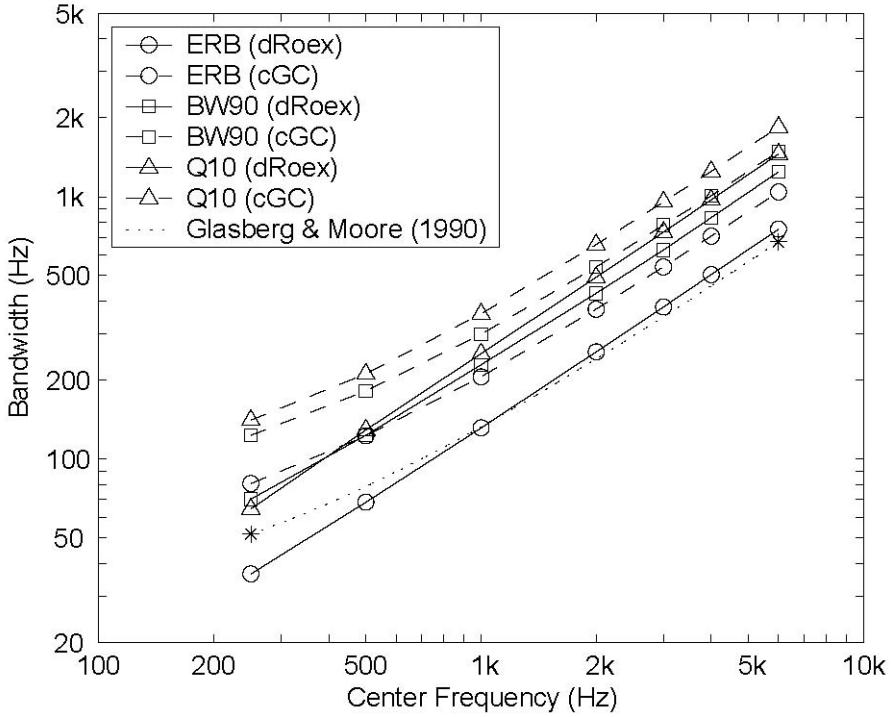

Fig. A1. Comparison of three bandwidth measures for the compressive gammachirp (cGC) filter and double roex (dRoex) filter when the level is 50 dB SPL.