

The Auditory System and Human Sound-Localization Behavior

Exercises Chapter 13

Problem 13-1 Derive the race model distribution of minimum reaction times (Eqn. 13.3), and identify each of the two terms.

Problem 13-2 Derive expressions for the mean and variance for the multiplication of two Gaussians, $N(\mu_1, \sigma_1)$ and $N(\mu_2, \sigma_2)$, respectively.

Problem 13-3 Derive expressions for the mean and variance for the multiplication of three Gaussians, $N(\mu_1, \sigma_1)$, $N(\mu_2, \sigma_2)$ and $N(\mu_3, \sigma_3)$, respectively.

Problem 13-4 Derive expressions for the gain and variance ratio's in case the responses are described by mean and variance of the posterior distribution.

Problem 13-5 Derive Eqn. 13.21.

Problem 13-6 Apply 13.21 to the data of Fig. 13.4, and estimate the prior variance, S_p , for gaze shifts. Assume that the largest variance in the data is due to scatter in the estimates for elevation. However, from the gain plots (center insets in Fig. 13.4) you may now also estimate the azimuth scatter on the basis of Eqn. 13.21!

Problem 13-7 Calculate the Multisensory Enhancement Index (MI) for the -12 dB and the -18 dB results, plot the results for all SNRs, and verify whether there is indeed a trend for 'inverse effectiveness' of multisensory integration as a function of the sound's SNR.