1 Chapter 8 Binary Classification

Problem 8.1 ***What would the psychometric curve of a noiseless observer look like?***

For a internal noiseless observer, the measurement x would be the function of the true stimulus — there is no uncertainty.

Therefore, the function would become a step function. Here is the logic:

$$P(\text{choose } s_+ \mid x) = \begin{cases} 1 & \text{if } x > \theta \\ 0 & \text{if } x < \theta \end{cases}$$

here, θ is the decision boundary.

If there is a noiseless observer, they always makes the correct decision whenever x is on the correct side of the boundary. There is no variability or uncertainty in the response. Thus, the psychometric curve transitions directly from 0 to 1 at the threshold θ — thus, there would be a vertical step rather than a smooth sigmoid.