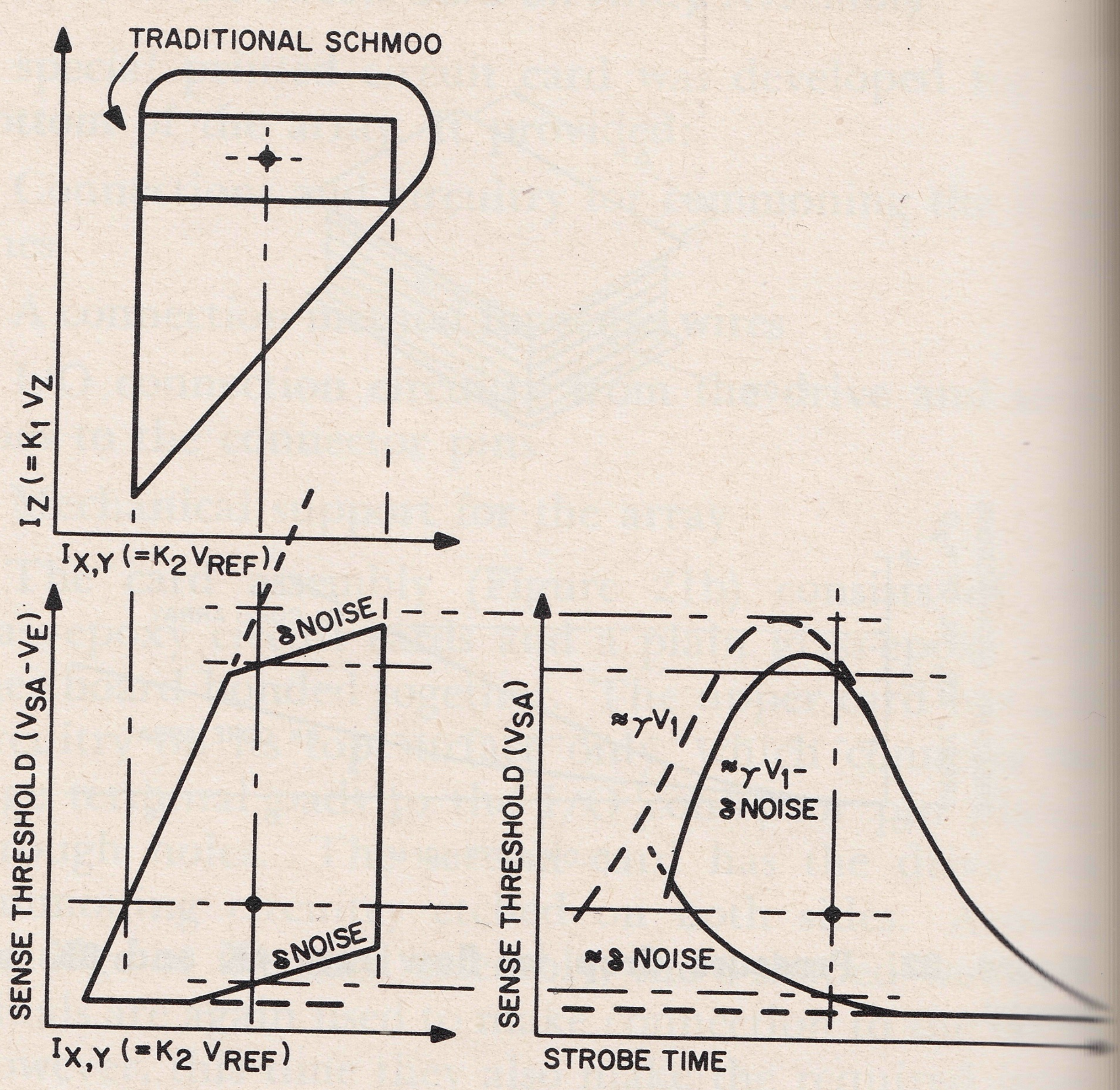

Figure 24. Relationship between SHMOOs on $I_z/I_{x,y}$ plot and V_{sa}/t_{strobe} plot.

the traditional SCHMOO. It may be seen from Figure 24 that lowering the V_{sa} operating point or moving the t_{strobe} operating point left will cause the left margin on the $I_z/I_{x,y}$ SCHMOO to move left. Thus the largest traditional SCHMOO will be achieved when V_{sa} is just above its margin. Obviously then, any slight change in either V_{sa} or t_{strobe} can cause an error (i.e. cause the SCHMOO to collapse completely).

It should be possible for the designer to calculate or measure the stability and repeatability of the operating points for the four critical parameters:

(1) $I_{x,y}$
(2) I_z
(3) V_{sa}
(4) t_{strobe}

He should then decide what margins he realistically needs in the $I_z/I_{x,y}$ *and* the V_{sa}/t_{strobe} planes.

A process of trial-and-error iterations can be used to zero-in on an operating point that meets the margin requirements on *both* SCHMOO's. It should again be stressed that this will not be the largest possible traditional SCHMOO. It will, however, yield the most reliable operation overall.

SIDEBAR 2

Statistical Design Program Using Monte Carlo Methods

The design program assigned values to all components, calculated the input signal required to produce a "ONE" at the output, stored the results, and repeated. Each time through, new component values were chosen randomly. After 1000 such runs, the cumulative results were plotted as a histogram which closely approximated the Normal Density Function. The 3σ points were taken as the limits of the "gray area." In other words, any input smaller than the lower 3σ point is a guaranteed "zero," any input greater than the upper 3σ point is a guaranteed "one," and any input between is indeterminate (see Figure