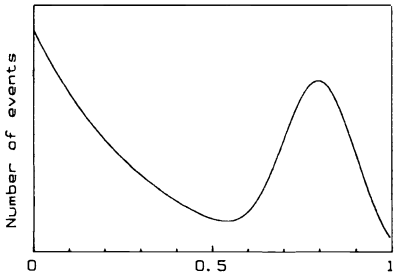

FIG. 1. A typical HEP figure. Signal events stand out from a background when some variable x is histogrammed, and can be separated by some cut in **x.**

Application of a cut in such a case seems undesirable, as it entails throwing away a large number of wanted events—data just outside the cut contain a sizable proportion of signal events—but accepting the data just inside, which contain a sizable amount of unwanted background. **A** more satisfactory approach is to apply some weight function $w(x)$ which is large in the regions where the signal is high, small in the regions where there is little signal, and of intermediate size in the region where both signal and background are important.

This note offers a complete prescription for reconstituting signals from the data, using such weighting techniques. Faced with a distribution like that of Fig. 2, from which the signal contribution is to be extracted, one would want to know:

What are the results of using a particular weight function?
What is the best weight function to use? How good is it?
Where is the best place to put a cut?
Which gives better results, the best weight or the best cut?
Is there any better technique?

This paper answers all these questions.

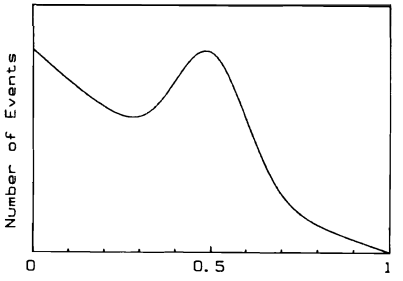

FIG. **2.** A situation similar to Fig. 1, but a clean separation is not possible