

We study the bimodality of the mixture of two unimodal distributions. In the special cases we give necessary and sufficient conditions ensuring the bimodality of such mixtures. We study the probability of the event that the histogram of a random sample from unimodal distribution indicates two peaks. For some types of unimodal distributions it is possible to simplify this problem and we can study histograms of samples from uniform distribution instead. We show that for increasing number of observations the probability that histogram with N classes has two peaks tends to the probability that the random permutation of numbers $1, \dots, N$ is bimodal.