Is there any difference to the decision or conclusion based on the critical value or p-value approach? State the advantage of one approach over the other.

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It is widely known that they are two approaches for making a statistical decision regarding a null hypothesis. One is the critical value which is defined as a rejection region approach and the second is the p-value(probability value) approach.

The critical values are the values of the test statistic that separate two regions, the rejection and non-rejection regions. The p-value, however, is the probability that the test statistic equals the observed value or a higher value under the assumption that the null hypothesis is true.

When comparing the two, the two methods give the same results when testing the null hypothesis. The P-value approach on another note has the advantage that any statistician is only required to compute one value to conduct the test. When one chooses to use the critical value approach, it is required to compute the “test statistic” and find the critical value analogous to the determined level of significance. Based on my research, since the P-value requires only a single computation, it is faster to use the P-value approach for hypothesis testing to get an immediate result.

From what I encountered today, I realised that the critical value is a score such that the tail from zero equals the level of significance. The advantages are that this approach is much clearer to understand, and the probability of occurrences can be fixed. However, the test statistic does not infer anything unless it is compared with the critical values.

Thank You and Have a Nice Day! :)