ON RESISTANT VERSIONS OF THE STANDARD SCORE

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ABSTRACT

Introducing an outlier that is very large to a data sample results in the z-scores of the other data values tending to be negative and decreasing in magnitude. If the outlier is large enough, the mean will exceed the second largest value and the z-scores of all of the data values, except the outlier, will be negative. An outlier that is much less than the other data values causes the z-scores of the other values to tend positive. Obviously neither circumstance is desirable. This manuscript introduces variations of the z-score, which are resistant to outliers. These variations replace both the mean and standard deviation in the usual z-score formula with corresponding resistant measures. The breakdown points of the introduced measures will be discussed. Computer simulations will also be used to compare the new measures. Ease of computation will also be considered. Some of the introduced measures will be flexible, thus a user can select the measure whose properties are best suited for the application at hand.

Keywords: *z-score, outlier, measures of central tendency, measures of dispersion*