COTTON MATURITY DISTRIBUTIONS AND IMMATURE FIBER CONTENT

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Abstract

This paper presents the software algorithm improvements in the Fiber Image Analysis System (FIAS) that eliminate its previous bias on detecting immature fibers in cross-section images, and the analysis of cotton maturity distributions of a set of cotton samples. The new FIAS can substantially increase detectable fibers, particularly immature fibers, and generate more realistic maturity distributions. It is found that the maturity distributions of most samples exhibit significant skewness and kurtosis, and therefore are not normal. The sole measurement—the mean value of cross-sectional circularity (or theta) used in cotton maturity characterization is not sufficient to reflect the level of maturity for bale cotton fibers. Other measurements based on distribution characteristics should be included. The paper will discuss the approaches to transform the data set into normal and the new parameters based on the transformed data. In addition to the maturity measurement, the immature fiber content will be defined from the distribution as well.