

Estimating the plank production by batch sampling

Enterprise

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Abstract

In the forest industry, the chopping logs produced in the forest are transported to a saw mill where they are transformed into planks of varying quality. Because the physical characteristics of the logs vary a lot, there is a great variability in the numbers and types of planks made out of a given batch of chopping logs. Although one can predict fairly accurately the volume of planks produced by a mill, it is much more difficult to predict the distribution of this volume among planks of varying qualities.

To solve this problem, we propose to analyze the distribution of the products (i.e., the planks) as a function of the known characteristics of the log batches. We wish to be able to use our knowledge of the various *types of logs* in order to predict the distribution of the output among planks of varying qualities. A log type is defined by the characteristics of the chopping log: tree species, quality and dimensions.

The team will have at its disposal the data pertaining to the processing of n batches of m logs each, as well as the characteristics of these logs. Here is a list of the characteristics and the number of potential classes for the first four characteristics.

- Diameter (22 classes)
- Length (3 classes)
- Quality (20 classes)
- Tree species (2 species)
- Volume

The number of potential types is thus greater than 2000. The output of the processing of the logs is described in terms of plank volume (by tree species, quality, and colour).