VIRTUAL RESTORATION OF FOREST STANDS BY RESULTS OF MEASURING STUMPS

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Stumps are the only evidences about former forest stands after cutting off all trees and clearing the felling area. Frequently it is necessary to obtain some information about recently growing forests that do not exist. Advanced information technologies created new possibilities for solving problems of this kind. Cut off forest stands can be virtually restored by using mathematical modelling and standard computer programs. For this reason some empirical formulas are needed.

At first it is important to design the equation of tree trunks tapering curve. If results of measuring several tree trunks with diverse parameters or dimensions are drawn in one picture, a sufficient chaotic crossing or different broken lines are obtained. It is impossible to notice any connection. Idea to realize the linear transformation in longitudinal and transverse directions with changing actual diameters and distances from the butt-end turned out very successfully. The further calculations proved that the sixth power polynomial is good enough for smoothing of relative diameters in dependence on the relative height. The final connection between a freely selected distance from the butt-end and the corresponding actual diameter can be obtained by applying reverse transformation, respectively, by an even extension or reduction of the mean transformed model of the tapering curve in longitudinal and transverse directions.

The intention to use the equation of isosceles hyperbola for smoothing the connection between the thickness and height of a tree for the first time was approbated by author of this paper. Advantages of hyperbola as compared to classical parabolic interpolation for the approximation of monotonous values proved to be obvious. It is necessary obtained indirectly the primary information about height of cut trees. For example, the thickness and height of trees with different dimensions can be measured not far from the felling area in similar growing conditions. If part of data for further processing are acquired by using hyperbolical interpolation, it is sufficient to add there results of direct measurement the leaved in felling area stumps, and all necessary information for virtual restoration of cut forest stand is collected. At present it is possible to carry out for any tree trunk reverse transformation, and the equation of proper tapering curve for tree trunk with given dimensions is obtained. The assortment structure analysis and estimation the lost timber resources can be realized, if conditions of round wood dimensions and prices are determined.