

Original article

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## Dynamic Model of Growth by Mean Stand Diameter of Pine Plantations

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**Abstract.** *There are many methods for modeling the growth of forest stands by mean diameter. In recent decades, methods have become most widespread, on the basis of which it is possible to develop models that are invariant with respect to the base age. The purpose of the study is to model the growth by the mean diameter of pine forest plantations using a generalized algebraic difference approach. For the study, data were selected from measurements of forest stands in pine plantations on 89 permanent sample plots of the Forest Experimental Station of the Russian State Agrarian University – Moscow Timiryazev Agricultural Academy. As a result of the study, for pine forest plantations growing in similar soil and climatic conditions, an equation based on a generalized algebraic difference approach, which is polymorphic, and the predicted curves are S-shaped, is substantiated as a better model for growth by mean diameter. The model is invariant with respect to the base prediction age and directly estimates the growth process based on any mean diameter and age value, thus providing consistent predictions. The developed model can be applied in the conditions to which the experimental materials belong. The considered technique can be used to model growth along the mean diameter of other forest-forming species in Russia.*

**Key words:** *diameter growth, forest plantations, pine, growth model, generalized algebraic difference approach*

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