



Organized by Odessa National Polytechnic University,
National Technical University «Kharkiv Polytechnic Institute»,
Sumy State University
and International Association for Technological Development and Innovations

InterPartner

Grabchenko's International Conference
on Advanced Manufacturing Processes **2021**

<http://interpartner.odessa.ua>

**3rd Grabchenko's International Conference
on Advanced Manufacturing Processes
September 7-10, 2021 | Odessa, Ukraine**

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Modeling Parametric Failures of Woodworking Machines According to the Technological Precision Criterion

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A radial model of parametric failure of a woodworking machine according to the precision criterion based on the truncated normal distribution of a machine's disadjustment speed caused by the wear processes in the mating of parts and components of the structure has been developed. It has been found that the density of parametric failures of woodworking machines according to the precision criterion corresponds to alpha distribution. Based on the operational observations, the alpha distribution parameters of operating time to parametric failure for band saw, circular saw, and milling machines have been established. It has been determined that the durations of inter-adjustment periods for band saw, circular saw, and milling machines coincide with the operational data of the duration of these inter-adjustment periods for these machines with an accuracy of seven percent, which proves the adequacy of the mathematical model. The proposed model of parametric failures of woodworking machines based on the processing precision criterion allows determining the durations of inter-adjustment periods of machine operation, during which the precision of processing is ensured in compliance with the current standards.