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EDITORIAL

Announcement of B. John Davies Prize for the best paper published in IJAMT in 2021

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The B. John Davies Prize for the best paper published in IJAMT 2021 has been awarded to Jiejun Xie, Pengyu Zhao, Pengcheng Hu, Yang Yin, Huicheng Zhou, Jihong Chen, and Jianzhong Yang.

The prize recognizes exceptional articles published in IAMT and awards authors for making an especially significant contribution. The award was named after the late B. John Davies of the University of Manchester Institute of Science and Technology (UMIST), the founding editor-in-chief of IJAMT, who led the journal from its launch in 1985 until 2013.

Process

From all the papers published in 2021, 17 papers were shortlisted with an editor rating above 90 in the first round. The next round selected six finalists, and each paper was carefully scrutinized by the regional editors. The following paper has received the highest vote and is awarded the 2021 B. John Davies Prize.

Title of paper

Multi-objective feed rate optimization of three-axis rough milling based on artificial neural network

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Abstract

Feed rate in computerized numerical control (CNC) milling is an essential parameter that could affect both the machining efficiency and the working conditions of the machine tool. In this paper, we proposed a multi-objective feed rate optimization method for three-axis rough milling. The in-process machining data generated in the machining process is calculated and aligned for building the data-based model of spindle power, and an artificial neural network (ANN)-based modeling approach is proposed for the spindle power. Based on the proposed model, a multi-objective optimization framework is presented to optimize the feed rate with the objective of increasing the machining efficiency and the loading stability of the spindle. To validate the feasibility and advantage of the proposed methods, a set of machining experiments are conducted, showing that our proposed ANN-based model has good accuracy in terms of predicting the spindle power, as well as that the feed rate optimization framework as solved based on the multi-objective evolutionary algorithm based on decomposition (MOEA/D) can effectively improve the machining efficiency and reduce the fluctuation of spindle power.