

Networked Implementation of Milling Stability Optimization with Bayesian Learning

Authors : Christoph Ramsauer, Jaydeep Karandikar, Tony Schmitz, Friedrich Bleicher

Abstract : Machining stability is an important limitation to discrete part machining. In this work, a networked implementation of milling stability optimization with Bayesian learning is presented. The milling process was monitored with a wireless sensory tool holder instrumented with an accelerometer at the Vienna University of Technology, Vienna, Austria. The recorded data from a milling test cut is used to classify the cut as stable or unstable based on the frequency analysis. The test cut result is fed to a Bayesian stability learning algorithm at the University of Tennessee, Knoxville, Tennessee, USA. The algorithm calculates the probability of stability as a function of axial depth of cut and spindle speed and recommends the parameters for the next test cut. The iterative process between two transatlantic locations repeats until convergence to a stable optimal process parameter set is achieved.

Keywords : machining stability, machine learning, sensor, optimization

Conference Title : ICPMM 2022 : International Conference on Precision Machining and Manufacturing

Conference Location : Amsterdam, Netherlands

Conference Dates : January 21-22, 2022