

# Author's Accepted Manuscript

A novel approach for the prediction of the milling stability based on the Simpson method

Zhao Zhang, Hongguang Li, Guang Meng, Chong Liu



PII: S0890-6955(15)30065-1

DOI: <http://dx.doi.org/10.1016/j.ijmachtools.2015.09.002>

Reference: MTM3095

To appear in: *International Journal of Machine Tools and Manufacture*

Received date: 28 May 2015

Revised date: 31 August 2015

Accepted date: 1 September 2015

Cite this article as: Zhao Zhang, Hongguang Li, Guang Meng and Chong Liu, A novel approach for the prediction of the milling stability based on the Simpson method, *International Journal of Machine Tools and Manufacture* <http://dx.doi.org/10.1016/j.ijmachtools.2015.09.002>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting galley proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain

# A novel approach for the prediction of the milling stability based on the Simpson method

Zhao Zhang, Hongguang Li\*, Guang Meng, Chong Liu

State Key Laboratory of Mechanical System and Vibration, School of Mechanical Engineering, Shanghai Jiao Tong University, Shanghai 200240, China

\* Corresponding author.

Tel: +86 21 34206332-816; fax: +86 021 34206814

E-mail address: hgli@sjtu.edu.cn

## Abstract:

In this paper a new approach is presented for predicting the milling stability based on the Simpson method. Generally the milling dynamic process is described as a linear time-periodic system with a single discrete time delay. By dividing the tooth passing period equally into a finite set of time intervals, the Simpson method is utilized in each time interval to estimate the state items. Then the state transition matrix over one tooth passing period is constructed, and the milling stability could be predicted by the Floquet theory. The convergence rate of the proposed method is discussed, and two benchmark examples are conducted. The results show that the proposed method achieves satisfactory accuracy and efficiency.

Key words: milling stability; Simpson method; Floquet theory; rate of convergence

Download English Version:

<https://daneshyari.com/en/article/7173413>

Download Persian Version:

<https://daneshyari.com/article/7173413>

[Daneshyari.com](https://daneshyari.com)