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DYNAMIC BEHAVIOR OF PLANETARY GEARBOX NEW CONCEPT

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Summary: Noise and vibration have a very negative influence on mechanical gearbox functionality. That is the reason why a lot of attention is given to these analyses.

A new concept of planetary gearbox is presented in this paper. Both a two dimensional model, and three dimensional model has been developed. Based on known dynamical models of mechanical gearboxes, the new dynamical model is defined for this specific concept of planetary gearbox. The paper concludes with the discussion and guidelines for further work.

Keywords: planetary gearbox, dynamic analysis, dynamic model

1. INTRODUCTION

Planetary gearboxes with their compact design are largely represented in operating systems of mobile machinery. Operating conditions for transmissions in mobile machinery vary within a wide range. Research of the gearbox dynamics in this case is of great importance. Examining the dynamics of planetary gearboxes leads to conclusions that could greatly assist the development of planetary reducers with regard to: improving their compact design, increasing reliability, increasing the lifetime of the drive, reducing vibration and reducing noise in working conditions, etc.

Due to the aforementioned reasons a lot of research is done in the field of gearbox dynamics. Analysis of the dynamic behavior of planetary reducers is possible with various computer software, which perform simulations [1], [2], [3]. Computer simulation could be verified by experimental methods [4], [5]. An even greater impact on planetary drive research is given by the possibility of performing physical experiments to verify the computer simulated dynamic analyses.

In this paper a new concept of planetary drive has been developed. Its dynamic model has been made, which has been solved in *MATLAB – SIMULINK*, [6]. The results of the simulation are also presented in the paper. The paper also presents the conclusions drawn from the simulation, and possible directions for future research.

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