

Sensitivity analysis of the new concept of a vibration-reduction system for continuous miner

Mariusz Pawlak, Wojciech Klein, Jan Kania, Arkadiusz Mężyk

Abstract: In this paper are presented results from sensitivity analysis of the new concept of a vibration-reduction system for continuous miner developed by authors. In previous publications were applied the identifications of the vibration-control system parameters by tuning the excitation frequency to the eigenfrequency no. 4, which was dependent on the angular velocity ω . Because, at that mode, the centre of cutter drum does not vibrate, the excitation frequency during cutting could be tuned to that eigenfrequency. The obtained results were very promising, as the vibration of cutter drum was reduced with a specified angular velocity of 6.44 rad/s, exactly as it was assumed in the new concept of the vibration-reduction system. There is a need to apply different angular velocities when cutting various materials, and the sensitivity analysis of angular velocity and system stiffness parameters k_1 and k_2 must be applied. In this paper is presented the sensitivity analysis of the vibration-control system for a continuous miner in a wide range of angular velocity ω and system stiffness defined by parameters k_1 and k_2 .

-
- 1) Mariusz Pawlak, Ph.D.: Silesian University of Technology, Akademicka 2A, Poland (PL), mariusz.pawlak@polsl.pl, the author presented this contribution at the conference in the special session "Modeling and experiments of complex continuous systems" organized by F. Pellicano and A. Zippo
 - 2) Wojciech Klein, Ph.D.: Silesian University of Technology, Akademicka 2A, Poland (PL), wojciech.klein@polsl.pl.
 - 3) Jan Kania, Ph.D.: Silesian University of Technology, ul. Akademicka 2A, 44-100 GLIWICE, Poland (PL), jan.kania@polsl.pl.
 - 4) Arkadiusz Mężyk, Professor: Silesian University of Technology, ul. Akademicka 2A, 44-100 GLIWICE, Poland (PL), arkadiusz.mezyk@polsl.pl.