NEW DIRECTIONS OF DEVELOPMENT OF CONTINUOUS TWO-FLOW TRANSMISSIONS OF VEHICLES

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Stepless two-flow hydrovolumetric-mechanical transmissions of vehicles have a significant potential for improvement and are among the most promising for wheeled tractors, tracked vehicles, heavy trucks, etc. Along with stepless speed regulation, they are characterized by efficiency, which is a variable value and depends on the operating mode and external parameters. The limited use of volumetric hydraulic machines in two-flow turning mechanisms is due to the increased sensitivity of steering at high speeds, which can cause emergency situations. Solving the problem of increasing the efficiency can be achieved by introducing a set of electric machines into the transmission design - an electric motor plus an electric generator, which will perform the function of recuperating the parasitic power of the closed circuit, as well as energy during braking with the subsequent return of power to the transmission.

The well-known design of the stepless hybrid hydraulic-mechanical transmission, proposed in the utility model patent [1], provides for the recovery of parasitic power that circulates in the closed circuit of the hydraulic-mechanical transmission of the vehicle during acceleration and braking, when the relative parameter of the hydraulic volume adjustment capacitive transfer is in the range from "-1" to "0", and energy storage in the battery for further use by external consumers. However, mathematical confirmation of the effectiveness of such an improvement is not provided in the known publications of the patent authors. The research aims to generalize, systematize and experimentally confirm the influence of electric recuperators, which will be placed on different branches of two-flow hydraulic-volumetric-mechanical transmissions (turning mechanisms) of various structures, on their efficiency and controllability. Based on the results of experimental research, propose a mathematical model for accounting for losses for hydraulic machines in forward and reverse power flow.

References

1. Pat. 142465 Ukraina, MPK F16H 47/00 (2020/01). Hibrydna bezstupeneva hidroobiemno-mekhanichna transmisiia / Samorodov V.B., Balamut P.M., Khrapach L.M., Pelypnko Ye.S., Mittsel M.O.; zavnyk ta patentoutrymuvach Samorodov V.B., Balamut P.M., Khrapach L.M., Pelypnko Ye.S., Mittsel M.O. – № u 2019 11058; Zaiiavl. 11.11.2019; opubl. 10.06.2020, Biul. №11 - 4s.