

MATHEMATICAL MODEL OF SEQUENTIAL FEEDERS FOR CENTRALIZED LUBRICATION SYSTEMS

© 2008 D. Ye. Rybaltchenko¹, Ye. V. Shakhmatov², G. O. Belov², V. N. Ilyukhin²

¹Public joint-stock company «Avtovaz», Togliatti

²Samara State Aerospace University

The paper presents a system of differential and algebraic equations governing the operation of a sequential feeder. The block diagram of realization of equations that constitute a mathematical model of a sequential feeder is given. It allows making analysis of operating characteristics of sequential feeders and lubrication systems based on them in the Simulink system of modelling dynamic processes. The results of full-scale tests which confirm the adequacy of the mathematical model developed are presented.

Mathematical modeling, dynamics, designing, lubrication systems, sequential feeder, friction

References

1. Rybaltchenko, D. Ye., Tsaryov, A. M. Automated lubrication systems based on a pump unit with programmable feed in production systems with layout modification//. Transactions of the International Conference «Automatization and industrial control» Section «Automatization of technological processes». – Togliatti, 2006.
2. Rybaltchenko, D. Ye., Tsaryov, A. M. The use of sequential lubrication systems in industrial systems of machines with automatic unit replacement and changeable structure.// Mechatronics, automatization, control. No. 1, 2007, pp. 45-53.
3. Rybaltchenko, D. Ye. Adaptive lubrication of production equipment // High technologies, fundamental and applied research, education. Transactions of the Second international scientific-and-practical conference «Analysis, development and use of high technologies in industry». 07-09.02.2006, Saint Petersburg / Edited by A. P. Kudinov, A. S. Nazemtsev, D. Ye. Rybaltchenko. – Moscow, Forum, 2007 – 304 pp.
4. Patent 200273792 Russian Federation, International Patent Classification. Pump unit with programmable feed of lubrication material and centralized control / Rybaltchenko D. Ye.; applicant and patent holder – joint stock company «Avtovaz» - No 2004116647/06; application 01.06.2004; published 10.04.2006. Bul. No. 10-1 p.: ill.
5. Rybaltchenko, D. Ye., Tarkhov, S. F. Construction and operation principle of special lubrication devices. Standard designs. // System of computer-aided instruction. Collection manual. – Moscow, 2001-99 pp. – Dep. at Russian Academy of Education. No. 5047.
6. Pneumatic and hydraulic drives and systems: in 2 volumes. Volume 2. Hydraulic drives and systems. Foundations: Teaching aid / G. G. Matvienko, V. F. Samokhin. – Saint Petersburg: Polytechnical University Publishing House. – 2006 – pp. 308-310.
7. Gimadiyev, A. G. Choice of parameters, analysis of full consumption regulator static and dynamic characteristics: Teaching aid / Samara State Aerospace University, Samara, 2007-64 pp.
8. Abramov, Ye. I., Kolesnitchenko, K. A., Maslov, V. T. Hydrodrive elements: Reference book. – Kiev.: Tekhnika, 1969-319 pp.
9. Rybaltchenko, D. Ye. Experimental analysis of static and dynamic characteristics of a pump unit with programmable feed of lubrication material.// Samara State Aerospace University. – Samara, 2008-18 pp.: M.5 – Bibl. 6 name – Rus. - Dep at.
10. Patent 2319060 Russian Federation, A way of diagnosing automated lubrication systems / Rybaltchenko, D. Ye.; applicant and patent holder-joint-stock company «Avtovaz» - No. 2006116827/06; application 16.05.2006; published 10.03.2008. Bul. No. 7-1 p.: ill.

Rybaltchenko Dmitry Yevgenievitch, head of department of technical equipment production at the «AvtoVaz» joint-stock company. Area of research: dynamics of hydraulic systems, designing of hydropneumodrives of lubrication and cooling systems.

Shakhmatov Yevgeny Vladimirovitch, Doctor of Technical Science, Deputy Rector for Science and Innovations, SSAU. Area of research: dynamics of pipelines. Vibroacoustics. Vibroacoustic interaction of machine elements.

Belov Gleb Olegovitch, student, SSAU. Area of research: hydroautomation.

Ilyukhin Vladimir Nikolayevitch, Candidate of Technical Science, assistant of the department of automatic system of power engineering installations, SSAU. Area of research: dynamics of hydraulic and pneumatic systems, testing and maintenance of hydropneumosystems, digital pressure-and-consumption regulators.