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NECESSITY OF MECHATRONICS IN AGRICULTURAL MACHINES

Amini F. (ITMO University)

Scientific director – Dean of the Faculty of Control Systems and Robotics, Pyrkin A.
(ITMO University)

One of the ways to increase the quality and quantity of crop yields, reduce waste and losses, and perform timely and correct operations (from tillage to harvesting) is to use modern technologies in precision and up-to-date agriculture from the field of mechatronic engineering. Therefore, utilization of this field of engineering can be considered as a new way of changing the current Russian mechanization to the advanced one, thus improving the way of production of products and accelerating the conventional processes.

Introduction. The most essential supply chain of civilizations in human societies has been the food production chain throughout history, and the importance of ensuring its sustainability is growing day by day, as food security is one of the most important global issues in the 21st century. Traditional methods do not meet the day-to-day needs of communities and food security providers, and new ways of producing must be sought. The purpose of industrial agriculture is to use knowledge-based and mechanized agriculture and to utilize new technologies and engineering knowledge to increase crop production and reduce costs. Obviously, the benefit of mechatronic engineering in agricultural machinery can be used as a new way of moving beyond the conventional mechanization at the Russian level to the advanced one, ultimately enhancing the production process and accelerating conventional processes.

Основная часть. Precision agriculture, based on information technology and in the context of sustainable agriculture development, by collecting and storing spatial information and data processing, optimizes the use of production factors and institutions to increase productivity and reduce environmental hazards. The term mechatronics was first coined in 1969 by Japanese engineer Yaskawa Electric to integrate the fields of mechanics and electronics into electric motor control. Mechatronics engineering is today a rapidly expanding interdisciplinary branch of engineering. Nowadays, in most advanced automobiles (tractors, combines, etc.) there is at least one system built by mechatronic engineering. These systems are used in self-propelled agricultural machinery, tillage systems, agricultural planting systems, agricultural storage systems, agricultural harvesting systems and agricultural condition assessments. Given the industrialization of the agricultural production process in line with increasing consumer market demand, the export of products, and in order to increase productivity, awareness of the challenges ahead in modern and industrial systems, especially in the field of mechatronic systems, is very important. In fact, a machine or system with several microcontrollers, electric motors, sensors, wiring, and hundreds of lines of software code despite the mechanical components, and the various components can hardly be assumed to be just one mechanical system. Therefore, in mechatronic systems usually due to the number and variety of non-mechanical components the problem of reliability is more prominent and important.

Conclusions. Applying the features and capabilities of mechatronic technology and systems to agricultural machinery and systems can enable timely agricultural operations, better management, increased productivity and sustainable production, increased uniformity and better control of agricultural production, especially for Extensive cultivated areas will result. It is also inevitable to utilize these mechatronic engineering capabilities along with training in deployment for industrial-scale production and development of industrial agriculture and mechanization.

