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"Gheorghe Asachi" Technical University of Iasi, Romania

DESIGNING AN AGRICULTURAL MOBILE ROBOT WITH HYBRID LOCOMOTION

Ioan Doroftei[1,2,3*], Stelian Alaci[4], Marius-Gheorghe Hagan[5], Andrei Vieru[1], Ionel Staretu[2,6]

[1]Mechanical Engineering, Mechatronics and Robotics Department, "Gheorghe Asachi" Technical University of Iasi, 43 D. Mangeron Blvd, 700050 - Iasi, Romania
[2]Technical Sciences Academy of Romania, 26 Dacia Blvd, 030167 - Bucharest, Romania
[3]Academy of Romanian Scientists, 3 Ilfov, 05004 - Bucharest, Romania
[4]"Stefan cel Mare" University of Suceava, Mechanical Engineering Department, 13 Universitatii Str., 720229 - Suceava, Romania
[5]Applied Electronics and Intelligent Systems Department, "Gheorghe Asachi" Technical University of Iasi, 11A Carol I Blvd, 700506 - Iasi, Romania
[6]Product Design, Mechatronics and Environment Department, Transilvania University of Brasov, 1 Universitatii Str, 500068 – Brasov, Romania

Abstract

The context of research in the field of agricultural robots is defined by the need to develop advanced technological solutions to improve the efficiency and sustainability of agriculture. The use of agricultural mobile robots with hybrid locomotion represents an innovative approach to addressing these challenges. In this paper, a small scale concept of a mobile manipulator with hybrid locomotion is presented and analyzed. At a large scale, this robot can be used in agriculture for some applications, such as plant inspection, weeding, their chemical treatment or soil loosening, etc. First, the context of using mobile robots in agriculture is discussed and some examples of agricultural robots are shortly presented. Then, a short classification of the locomotion solutions used for terrestrial mobile robots and the advantages of the hybrid locomotion system, using legs and wheels, are presented. Before proposing the kinematics and a 3D design solution for a laboratory prototype, the robot specifications and requirements are defined. Based on the proposed design, a small scale prototype of the mobile manipulator is practically realized and some preliminary control algorithms, considering both walking and wheeled locomotion strategies, are proposed. Experimental tests in laboratory conditions and their results will be the subject for future work.

Keywords: agricultural applications, hybrid locomotion, mobile robot

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* Author to whom all correspondence should be addressed: e-mail: ioan.doroftei@academic.tuiasi.ro; Phone: +40 721166813