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## DESIGNING A MOBILE ROBOT WITH HYBRID LOCOMOTION FOR SUSTAINABLE AGRICULTURE

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### 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.

*Key words:* agricultural applications, hybrid locomotion, laboratory prototype, mobile robot,

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