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DESIGN OF A FERTILIZING ROBOT APPLICATION WITH REGARD TO ENERGY CONSUMPTION

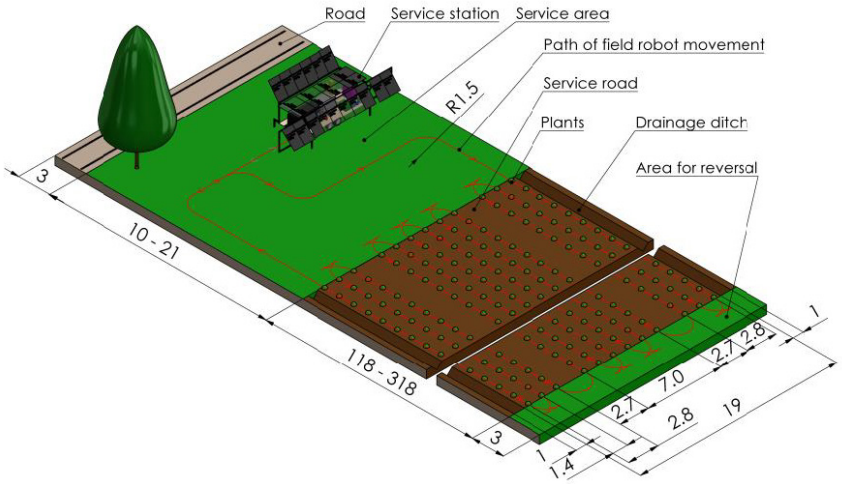
Jüri OLT[1*], Olga LIIVAPUU[2], Indrek VIRRO[3], Tormi LILLERAND[4]

[1–4] *Estonian University of Life Sciences, Fr. R. Kreutzwaldi 56, 51006, Tartu, Estonia*

[*] ***Corresponding author.*** *Email address: kosono@mail.nutn.edu.tw*

Abstract – Electrically driven agricultural robots experience faster battery depletion than vehicles moving on asphalt because higher rolling and traction resistance require more energy. The problem arises in areas without access to the electrical grid, where charging electrically driven agricultural robots is not possible, resulting in interruptions to the robot's continuous operation. A combined energy production station powered by biogas, hydrogen, and solar energy with the prototype of autonomous fertilizing robot for blueberry plantations to perform plant-based precision fertilization on depleted milled peat fields was created by the agrorobotics working group of the Estonian University of Life Sciences. The station includes unique components such as an automatic battery exchange system and an electric generator with a membrane motor. These, together with a solar energy and electric generator control system, as well as a battery charger, are mounted on a mobile platform. The objective of this article was to determine the energy requirements of an autonomous fertilizing robot during movement in the field and for carrying out technological operations. For this purpose, the mechanical power and energy required for the operation of the robot fertilizer spreader were first determined. Based on this, an accumulator with suitable power and capacity for the operation of the robot fertilizer spreader was selected. The travel distance of the robot on a single charge of the chosen accumulator was determined, as well as the traction power efficiency and specific power.

Keywords – Argicultural robot; biogas, hydrogen and solar energy; energy consumption; movable power station



Fragment of a field.

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