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# Simulation Modelling for In-field Planning of Sequential Machinery Operations in Cropping Systems

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## Description:

In highly mechanized agriculture farmers are facing challenges, both economic (e.g. higher labor costs, higher fuel prices) and environmental (e.g. legislation, effects of climate changes) in the strongly competitive agricultural market. In order to maximize the profits farmers have to reduce the production cost while maintaining high product quality. The annual cost of machinery management and operation is a significant part of the annual production cost. Therefore, the development of technologies to improve the machinery productivity and operational efficiency is of key importance.

During this study, field coverage planning methods and computer models aimed at improving the performance of agricultural machinery have been developed. In terms of optimized coverage planning, a three-stage planning method that generates feasible area coverage plans for agricultural machines in fields inhabiting multiple obstacle areas was developed; In terms of simulation model, a unified simulation model for sequential operations in potato production was developed. With the assistance of this simulation model, the farm managers can make better decisions on strategic (e.g. investing in machinery with an appropriate working width and capacity), tactical (planning of operations, notably driving direction) and operational (deciding fieldwork pattern, loading/unloading locations etc.) planning level.

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