

Title The vehicle routing problem in field logistics part I
Author D.D. Bochtis and C.G. Sørensen
Citation Biosystems Engineering, Volume 104, Issue 4, December 2009, Pages 447-457
Keywords vehicle; logistic

Abstract

The vehicle routing problem (VRP) has been characterised as one of the great success stories of operational research, providing and facilitating, for over fifty years, optimal planning solutions for vehicle fleets in a large number of real-life applications. In its simplest form, a VRP can be described as the problem of determining least-cost routes from one depot to a set of geographically dispersed “customers” (such as cities, stores, warehouses, and schools). VRP constitutes one of the most challenging combinatorial optimisation problems. A large number of different approaches have been developed over the years and a number of software packages are available on the market. In the agriculture, the VRP has only very recently been applied to the planning and execution of in-field operations, despite the fact that almost all agricultural field operations (AFO) inherently involve the motion of vehicles. In this paper, a dedicated classification of AFO is devised and tailored to a conceptual application of the VRP within the domain of agricultural field logistics. The concept regards the operations of primary agricultural machines, with the worked tracks in the field representing the “customers” using VRP methodology. By casting the agricultural fleet management problem in the framework of well-known VRP instances, over half a century of research and implementation experience can be brought to bear on the problem. This will provide for the enhanced management of conventional machinery systems, as well as, the mission and route-planning aspects of the high level control of emerging field robots.