

Abstract Book

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Forestry harvest planning considering social impacts and soil compaction issues

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December 12, 2022 (Monday), 14:00 - Room 1304

Forest harvest planning implies great challenges for wood supply companies. This type of planning involves complex decision processes involving different stakeholders, as well as factors outside the stakeholders that directly affect the resolution of the problem. Within these factors that affect, one of special interest is the conditioning by risk of soil compaction. This factor can be decisive in planning since it functions as a restriction or prohibition on harvesting operations. This phenomenon depends on the hydrological balances of the soils, which in turn depends on the meteorological and climatic conditions. That is why to properly address these decision processes, stochastic approaches are required. On the other hand, there exists a large number of SMEs and micro-SMEs that are dedicated to forest harvesting operations, which work as contractors for industries and provide. These companies have a direct interference in the industrial matrix and in the labor offer in the regional economy of the Argentine Northwest. However, a purely utilitarian approach to forest harvesting would tend to prioritize the hiring of larger companies with superior technical capacity, which would allow production costs to be reduced. However, this would impede the possibility of growth of the regional economy, leaving out smaller companies, which do not have the resources for technological migration. This issue has gained relevance after United Nations included this topic in its Sustainable Development Goals agenda (ODS 8). To contribute to this line, an approach based on mathematical programming is proposed that allow addressing the stochastic complexity of the problem (due to the risk of soil compaction), but that balance the workload delivered to each contractor, ensuring compliance with the demand. For this, a goal programming model is developed, which contemplates the minimization of costs and the balancing of the workload among contractors.

Keywords: Forestry harvest planning; Sustainability; Soil Compaction; Social impact; regional economies

Using prize-collection concepts to solve time-limited search problems: Application to humanitarian operations

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December 12, 2022 (Monday), 14:00 - Room 1305

Time-limited search problems are of high relevance in humanitarian operations. This can include applications from the perspective of government organizations, such as searching for injured people, assessing road damage, assessing building damage. This can also include applications from the perspective of the affected population, such as searching for essential commodities, such as food, supplies, water, and gasoline. We explore suitably defined prize-collection problems to help develop effective time-limited search strategies for such application settings. The challenge is to translate the information available for the search problem, including data on the spatial and temporal distribution of search objects and viewing time, to suitably defined prize values, locations and time windows for prizes. The solution of the defined prize-collection problem establishes the search path to be used. Theoretical constructs of the relationships between these prize-collection problems and the search problem being modeled are explored. Computational tests are conducted, along with extensive simulation testing to determine the effectiveness of these methods. Also, two case studies are developed and analyzed. One of these case studies is based on a problem that arises from the perspective of the government organization, and the other is based on a problem that arises from the perspective of the affected population.

Keywords: Time-limited search problems; Humanitarian operations; Prize-collection problems

Dynamic relocations in car-sharing networks

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December 12, 2022 (Monday), 14:00 - Room 1305