



Research School for Operations
Management and Logistics

Optimization modeling for excavation of sea-bed polymetallic nodules in a master-slave system

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The main purpose of this study is related to path planning concepts in an integrated robotic system (master-slave). There exist many different situations where two or more different robots should work together based on interactive relations for path planning purposes. These situations are controlled either by the slave robots themselves or by one/a few master robots receiving information from slave robots and giving order to them. Our research study involves a master robot controlling a slave robot for mining polymetallic nodules spread over a specific sea-bed area. To the aim of controlling this hybrid (integrated) system, our taken approach develops optimization models for this hybrid path planning system to provide more efficiency for an integrated maneuver of the master and slave robot. The developed optimization models should lead to an efficient integrated maneuverability of the master and slave robots, while reducing the energy consumption for both slave and master robots and maximizing the amount of the polymetallic nodules extraction, spread out over a specific sea-bed area.