COMMUNICATION BETWEEN INTELLIGENT ELECTRONIC DEVICES FOR MARITIME SCHEDULING TASKS

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Abstract

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The purpose of the research is to develop new mathematical models and new algorithms for mechatronic systems in maritime transport based on intelligent agent approaches and intelligent electronic controllers

Main goal of research is increasing of safety level of maritime transport by scheduling and negotiations. The mathematical model for intelligent agents of sea transport system is offered for task solution. The algorithm of optimal speed control is provided for vessel's agent. The algorithm includes speed control procedure and negotiations between intelligent agents.

Methodologies used in research are intelligent electronic devices and negotiations, artificial neural network controllers, bond graphing for mechatronic system analysis and control. The research proposes the solution for control task between intelligent maritime transport units and intelligent maritime control units with a purpose to prevent accidents. The model includes algorithms of intelligent ship mechatronic system control and intelligent schedule control.

Main advantages of using negotiations in intelligent agent systems is a possibility to coordinate action of all participants of the complex processes and to realize multi-criterial decision-making in scheduling, energy consumption optimization tasks. The results of coordination allow to reduce costs, to increase profit and to minimize idle time.

Paper proposes the solution of coordination between intelligent sea transport units with a purpose to follow according to timetable. The model of maritime transport system is defined and the algorithm for vessel motion control with negotiations between electric devices using intelligent agent approach is presented.

The workability of proposed models and algorithms is tested in specific simulation environment.