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Development of a Weather Adaptive Navigation System for Coastal Shipping

Masaru Tsujimoto, Yoshimasa Minami, Takahiko Murayama and Hiroshi Takai

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Summary: We propose a new navigation system for coastal shipping to decrease fuel consumption and CO2 emission. The navigation system, called WAN-CS, optimizes engine revolutions with constraint of the voyage schedule. For coastal shipping precise forecast system is expected because time of the voyage is short and geographical features of the route must be considered. Thus a new weather forecast system was also developed. The system forecasts four times a day though conventional system provides two times a day. The interval of spatial grid is selected in 2 minutes and the time interval is selected in 1 hour. Ship responses were estimated by solving equilibrium equations of longitudinal force, lateral force and yaw moment considering the engine characteristics. In this paper for reducing fuel consumption a simulation of a coastal cement carrier, which navigated the Ube-Nagoya route using WAN-CS was carried out. It is found that the fuel reduction by WAN-CS achieved 33% from the result of the simulation.