

The Fuzzy Method for Vessel Speed Limit and Pollution

Reduction on Summer in Keelung Port

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Abstract

When “Sustainable Development” has become the global trend as the most important topic. In the meantime, “Green Port” also has been emphasized the attention of the internal harbors. In the maritime management, government officers have gradually paid attention to the air pollution from ship and port activities. Green port program will be developed to achieve the continuous environmental protection, social and economic benefits through different management measure. This study integrates the AIS data, Marine Geography Information System (MGIS) and Fuzzy distinguish theory to propose the Optimum Speed for inbound vessels, not only to reduce the harbor air pollution and also ensure the safety of entry and exit of the port for all vessels. These seven algorithm blocks are used for the Fuzzy Logic Control (FLC) input. Including Turning Capacity (TC), Crush Stop Capacity (CSC), Wind and Current Effect (WACE), Ship Operating Capacity Index (SOCI), Environment Influence Index (EII), Ship Maneuvering Capacity Index (SMCI), Green Port Index (GPI); and one Optimum Speed (OS) output. This method provides the suggesting Optimum Speed for the captain and Vessel Traffic Service (VTS) as the reference navigation speed. Hence, while speed down for reducing the air pollution, also keeping the navigation safety and improving the port efficiency in simultaneously.

Keywords: AIS, Fuzzy Logic Control, Fuzzy Method