

Danmarks
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Project Plan

AUTHORS

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1 Project description

1.1 Overview

Dynamic positioning (DP) is a technology used to maintain the position and heading of a vessel, rig, or other marine structure, without the need for anchors or mooring lines, in both calm and harsh weather conditions. A DP system uses propulsion devices such as propeller and thrusters along with sensors to continuously adjust the vessel's position and heading in response to changing wind, current and wave conditions. A DP system is comprised of various subsystems, including a thrust allocation unit and a closed-loop control system. One of the objectives of the control-loop is to produce inputs to the thrust allocation unit, such that adequate force is produced to maintain a position or move towards a new desired set position. Such a control system is typically, laboriously, developed and tuned on a vessel-to-vessel basis. As a remedy, this project seeks to explore adaptive and self-tuning control methodologies and other control strategies that allow for the development of a generalised DP system.

1.2 Scope of the work

The goal is to develop a flexible DP framework that can be applied to multiple vessels without extensive adjustments. The data available is the length of the vessel and the sensor data regarding position, velocity, current and wave filtering. Initial data estimates on the vessel's hydrodynamic properties are also assumed as given.

1.3 Objectives

The minimum goal is to identify a system capable of acting on different vessels of the same class while respecting the safety and operational requirements demanded by regulations and by the project owner.

A more satisfying result would see the project end with an investigation of multiple controller/observer designs, identifying the architecture most capable of respecting the minimum requirements while also allowing for better performance in positioning and fuel efficiency.

2 GANTT plan

