

ABSTRACT

A six degrees of freedom dynamic model for the development of ballast control systems for semisubmersible platforms is described. The model includes the effects on the ballast tanks such as weights, moments and inertias as well as the platform dynamic. System parameters are computed from physical characteristics of the platform and from experimental results obtained with a small semisubmersible platform.

The development of a methodology and software capable of determining the immersed volume and center of buoyancy of a structure with complex geometry are points, which in this M. Sc. Dissertation, in view of the complexity of the process and importance of these parameters for model development.

The linearization of the model allowed the development of a control strategy capable of stabilizing the semisubmersible platform in initial conditions far from the balance.

The equations describing the motion of the platform in the vertical, roll and pitch degrees of freedom have been developed. The relocation of the poles and an observer of state were used in order to improve the control system.

Keywords: Dynamic modeling. Ballast control. Semisubmersible platform. Marine systems.

Mechanical systems. Identification parameters.