Scale Effects on Rudder Propeller Interaction

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The aim of this paper is to provide an investigation on two different lines related to rudder propeller interaction ; the first one upon the hydrodynamic effects due to the rudder propeller interaction in model scale and the second one a study about the scale effects that appears due to Rn. For the study a CPP and two different rudder geometries were employed. Towing tank results and CFD calculations have been compared in model scale. The mathematical model employed is based on the Reynolds Averaged Navier Stokes Equations solved using a Finite Volume method. Also different approximations for the propeller rotation model were employed in order to establish which one introduces less error. For the full scale study, in order to establish discrepancies, CFD results and different Towing Tank extrapolation methods have been compared. Ultimately this study aims to bring some light on the effect that energy recovery devices, such as the rudder, have upon the propulsion performance and the effect that Rn have upon them.

Intro
Descripción geométrica y física
Descripción casos
Descripción métodos numéricos y modelos matemáticos
Escala Modelo
Escala Buque
Análisis de convergencia espacial
Análisis de discretización temporal.
Disquisición entre las diferentes aproximaciones
Comparación con datos experimentales y distintas extrapolaciones
Visualización de magnitudes
Vorticidad
Velocidades medias aguas abajo y arriba (integradas y circunferenciales)
Plots de escalares aguas abajo y arriba
Localización y visualización de vórtices

Full scale calculations Original rudder

MRF

0º
Estudio convergencia

45º

RBM

Courant 1

Courant 2

Full scale calculations Modiffied rudder

MRF

RBM

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