



TUHH ~ Institut für Entwerfen von Schiffen und Schiffssicherheit
Schwarzenbergstraße 95 C ~ D - 21073 Hamburg

University of Applied Sciences
FH OOW
Constantiaplatz 4

26723 Emden

2009-03-03

Abstract for 3rd Squat Workshop – Nautical Aspects of Ship Dynamics

Operation-Based Ship Design and Evaluation

Georg Eljardt

The presented paper discusses a newly developed approach to ship design evaluation and optimisation. It employs Monte Carlo simulations in order to reproduce and predict lifetime operation conditions of a projected (or existing) vessel. On basis of statistically analysed operational and environmental data in combination with direct calculations of the vessel's propulsion it is possible to benchmark different designs regarding various parameters. These parameters can either be design-, but also operation-specific.

Applying the Monte-Carlo-Method, the vessel's speed, its floating condition and the environmental conditions (wind and sea state) are determined for a sufficient number of parameter sets. Subsequently the equilibrium condition for the propulsion point is computed, utilising an already implemented manoeuvring algorithm. Following this proceeding, it is possible to identify the specific requirement profile and to align the vessel's design or the operating conditions (e.g. trim distribution) with this profile.

Since this methodology computes fairly fast, it offers the possibility to assess the impact of design variations economically and ecologically. This assessment can be adjusted to different vessel types, shipping routes and connected to this the commodity flow, tailored to the customer's needs.

In order to validate the calculation method's feasibility, the algorithm's results have been checked against measured long-term data from various vessels of different type in operation.

With best regards

Georg Eljardt

Postanschrift:
Dipl.-Ing. Georg Eljardt
Inst. für Entwerfen von Schiffen und Schiffssicherheit
Schwarzenbergstraße 95, Gebäude C
D - 21073 Hamburg

Telefon:
++49 (40) 428 78 - 6070
Fax:
++49 (40) 428 78 - 6139

E-mail:
eljardt@tu-harburg.de
www.ssi.tu-harburg.de