# Multi objective design optimization of a cargo ship rudder, using the efficiency of the ANSA-modeFRONTIER-META coupling

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## Abstract

*Components of great importance for the ship safety are subjected to extensive analyses to ensure minimum failure risk and high performance. In such cases, the design process involves Finite Element Method simulations with which the model behavior for several loading conditions is evaluated. Analysts need to provide feedback to the designers regarding the simulation results and propose design changes towards the achievement of the required product’s performance characteristics. Following that, the designers have to propagate the proposed changes by updating the products geometry.*

*The automated definition of the CAE simulation model becomes essential during the above design loop, because a great amount of engineering hours are saved. Through an automated process, the analyst is able to produce CAE models for various disciplines and load cases, which are updated for each design change of the product.*

*This paper presents the implementation of an automated process for the definition of a CAE model of a spade rudder with rudder trunk and the strength analysis of it. The automated CAE model set-up capability of ANSA pre-processor is used to define CAE models for static, contact and CFD analyses. ANSA, and μETA post-processor, which is exploited for the extraction of responses from the solver results, are coupled to the modeFRONTIER optimizer for the identification of the best rudder shape.*