Mathcad model for the estimation of cost and main characteristics of Air-Cushion Vehicles in the preliminary design stage

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In the naval architecture terminology, the term ACV (Air Cushion Vehicle) refers to this category of vehicles, in which a significant portion of the weight (or all the weight) is supported by forces arising from air pressures developed around the craft, as a result of which they hover in close proximity to the sea. Major types are hovercrafts and SES (Surface Effect Ships).

In order to cover this future trend in marine transportation, a MathCAD model for the estimation of the main characteristics of Air Cushion Vehicles in the preliminary design stage is being developed. This model is based on a statistical analysis of the various parameters of existing crafts. For this reason, a statistical database has been created using publicly available information. A regression analysis has been performed using the data collected and the trend lines for every case have been derived.

For the validation of the code, LCAC (Landing Craft Air Cushion) is used as the reference vehicle. The values of LCAC design parameters that are known, are input in the code and crosschecked with the outputs. Iterative procedures have been applied to the code in order to correct the trend lines according to the reference model.

The development of this MathCAD model is directly related to the lack of software dealing with the design of ACVs in the market. Conventional ship design tools are widespread and used even by students. On the other hand, ACV design programs are possessed by the companies that design this kind of crafts and are not widely available.