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Mesh Optimization for Ground Vehicle Aerodynamics

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A mesh optimization strategy for accurately estimating the drag of a ground vehicle is proposed based on examining the effect of different mesh parameters. The optimized mesh parameters were selected using a Design of Experiments (DoE) method enabling simulations to be carried out in a limited memory environment, and in a timely manner; without compromising the accuracy of results. The study was extended to take into account the effect of model size. A simplified car model at three scales has been investigated and compared with results from the MIRA model wind tunnel. Parameters that lead to drag values closer to experiment with less memory and computational time have been identified. Scaling the optimized mesh size with the length of car model was successfully used to predict the drag of the other car sizes with reasonable accuracy. This investigation was carried out using STAR-CCM+, a commercial CFD package; however the findings can be applied to any similar CFD code

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