Abstract Submitted
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Three-dimensional simulation of slip-streaming in vehicle aerodynamics SAURAV MITRA, Convergent Science Inc. — Simulation of slip-streaming in vehicle aerodynamics is computationally challenging. To resolve turbulent wakes, and estimate drag between two co-linear vehicles with less number of computational cells requires advanced techniques. In this study, the variation of drag reduction and increase arising due to different inter-spacing between two Ahmed vehicles bodies (canonical vehicle geometry with 30° slant back angle) are presented. The computational fluid dynamics solver CONVERGE was used, for its automatic mesh refinement (AMR) capabilities. AMR is based on the second derivative of shear and normal components of velocity gradients and was used to resolve the flow around geometric features such as the frontal area, the slant back, etc. Steady-state density-based solver is used where each cell has its own pseudo time-step based on the local numerical stability criterion. The RNG k-ε turbulence model was used to model turbulence. The non-dimensional inter-spacing based on vehicle length, was varied from 0.1 to 2.0. The largest grid size used here was 0.04 m and the smallest was 0.005 m to resolve the turbulent wake which is characterized by a strong vortex system, longitudinal counter-rotating vortices arising from the slant back.

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