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Optimizing Jets for Active Wake Control of Ground Vehicles



A Detached Eddy Simulation (DES) turbulence model is used to conduct wake refinement of a 25 deg Ahmed reference body. This model was chosen for its highly three-dimensional flow characteristics and its ability to properly simulate a standard automotive wake.

Slot jets were designed at the rear of the Ahmed body and several optimization simulations were conducted using Optimate+. The initial optimization simulations were conducted to determine the sensitive variables. These variables were jet velocity and exit angle. After these variables were determined, another optimization simulation was conducted with a net drag reduction of over 15%. Finally, suction on the rear slant of the Ahmed body was investigated and optimized, with even greater drag reduction found. This occurred due to a reduction in flow separation and the formation of a quasi-static wake.

Further simulations will involve the development of the system on a production vehicle.

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