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CFD simulation with analytical and theoretical validation of different flow parameters for the wedge at supersonic Mach number (Article)

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Abstract

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In this paper analytical and numerical methods are used to evaluate flow over a wedge at supersonic Mach numbers. Closed form solutions are obtained for various semi-vertex angle of the wedge and the Mach numbers. Supersonic similarity parameter has been used to obtain the pressure distribution over wedge at different angle of attack with attached shock wave case. Results are in good agreement with the theory. For the analysis a strip theory is used which are independent in the direction of the flow. To simulate the results, the finite element (FE) method has been used. The validation has been done using the second order shock-expansion theory and the analytical solution obtained by Ghosh's unified supersonic/hypersonic theory. © 2019, IJENS.

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