Thermally Perfect Augmentation of a Supersonic Air Inlet Design Tool

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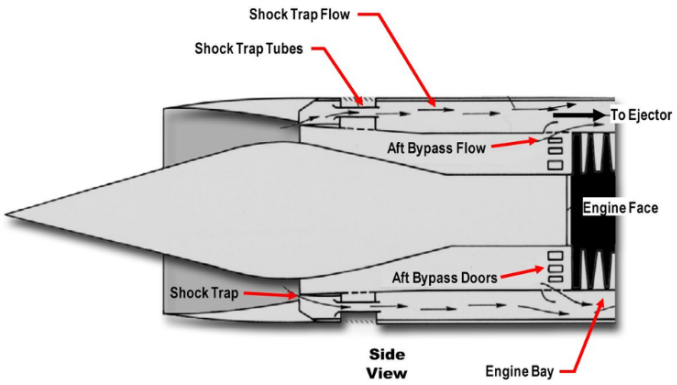

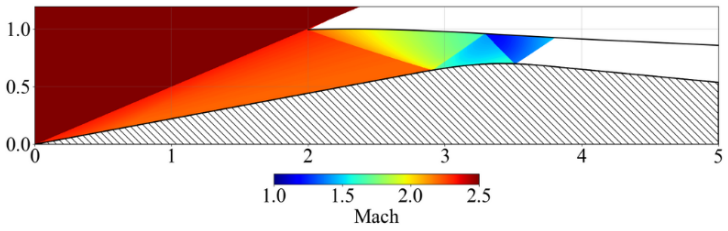

This work is the first in a series to augment a supersonic air inlet design tool based in Python 3 to incorporate new models that increase the range of applicability of the tool. This effort focuses on improving the thermodynamics model by incorporating a thermally perfect gas model. This tool utilizes method of characteristics to solve the governing equations for an inviscid, irrotational, isentropic, steady, supersonic flow field. Multiple test cases are used to assess the accuracy of all new models. A comparison is made between the original code's test case for a supersonic inlet at low temperatures to verify the implementation. Another test with high temperatures is presented to demonstrate the new models effects on the flow field. Finally, a simple geometry for hypersonic flow is created and analyzed so later work can validate the models with experimental data.