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Inclusion of Separation in Integral Boundary Layer Methods¹
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integral boundary layer (IBL) method coupled with a potential flow solver quickly
allows simulating aerodynamic flows, allowing for aircraft geometries to be rapidly
designed and optimized. However, most current IBL methods lack the ability to
accurately model three-dimensional separated flows. Various IBL equations and
closure relations were investigated in an effort to develop an IBL capable of model-
ing separation. Solution techniques, including a Newton’s method and the inverse
matrix solving program GMRES, as well as methods for coupling an IBL with a
potential flow solver were also investigated. Results for two-dimensional attached
flow as well as methods for expanding an IBL to model three-dimensional separation
are presented.

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