

Abstract Submitted  
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**Inclusion of Separation in Integral Boundary Layer Methods<sup>1</sup>**

BRODIE WALLACE, CHARLES O'NEILL, The University of Alabama — An 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 modeling 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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