Figure 1

# Enhancement of a Python Integral Boundary Layer Method

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**June 6, 2025, 10:00 AM in 41-122**

Figure 2

**Viscous fluid analysis is an important study in a large variety of fields and applications. This thesis presents a series of additions to a Python based integral boundary layer software library known as PyBL. This library provides the user the means to calculate viscous flow properties using different models for boundary layer behavior. The additions include new laminar and turbulent integral boundary layer models originally developed for XFOIL and currently used in the program. A new method for PyBL was introduced to stitch laminar and turbulent solutions together. Additionally, a velocity treatment scheme was implemented for inviscid velocity profiles to address solution convergence issues in PyBL.**

**This work has been verified using a number of resources, ranging from comparisons to analytical solutions, empirical data, and results from XFOIL. The new laminar and turbulent closure solutions integrated into PyBL demonstrated their closer alignment to XFOIL results, which provides confidence in their implementation, as now these models can be utilized for inviscid flow problems beyond airfoils.**

Figure 3