Variational Methods for the Potential Flow Past An Airfoil
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This dissertation is concerned with the application of a boundary-field equation method to the potential flow past an airfoil. Utilizing an integral representation of the potential flow exterior to a circular auxiliary boundary, the flow problem is reduced to a non-local boundary problem in an annular region. Existence, uniqueness and regularity results for the weak solution for the nonlocal boundary problem are established. Galerkin approximate solutions are constructed and error estimates obtained. Finally, numerical experiments are included to verify the efficiency of the method.