

# Boundary element solution of the transonic integro-differential equation

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## **Abstract:**

The transonic integro-differential equation for two-dimensional flows is solved by boundary element methods. In addition to constant and quadrilateral elements we develop hybrid elements based on constant elements in the streamwise direction and variable elements in the transverse direction. Computation is carried out for parabolic-arc and NACA0012 airfoils and the results, which converge fast, compare favourably with finite-difference solutions. The hybrid elements are to be preferred because they yield results which are more accurate than constant elements without the computational complexity associated with quadrilateral elements. Moreover, they can be applied with a small number of nodes by using only one strip of rectangular elements.