1135-65-1665 **Noah J. DeMoes*** (noah.demoes@usma.edu), United States Military Academy, Department of Mathematical Sciences, PO Box 0872, West Point, NY 10996, **Gabriel T. Bann** (gabriel.bann@usma.edu), United States Military Academy, Department of Mathematical Sciences, PO Box 0150, West Point, NY 10996, and **Randy Boucher** (randy.boucher@usma.edu), United States Military Academy, Department of Mathematical Sciences, West Point, NY 10996. *A Complex Variable Boundary Element Method for Modeling Fluid Flow in High Aspect Ratio Domains.*

The Complex Variable Boundary Element Method (CVBEM) numerically solves potential problems found in several fields of science, technology, engineering, and mathematics. Approximate solutions to steady-state problems using the CVBEM satisfy the Laplace equation and are continuous on the problem domain, contrary to many conventional discrete methods found in industry such as the Finite Element Method (FEM). Typically, applications of the CVBEM have been limited to low aspect ratio domains. In this work, the CVBEM is applied to modeling applications in high aspect ratio domains and compared to the FEM to determine which method approximates solutions with least squares error.

The problem considered is fluid flow in a 90-degree bend. Comparing the CVBEM to the FEM, 3 different domain ratios, 1:10, 1:25, and 1:50 are used in conjunction with the boundary conditions. The CVBEM will use four different bases function families to determine the best basis function family used in the CVBEM to approximate the solution. The approximations will be compared against the FEM to determine the method to model problems with high aspect ratio domains.

The methods and solutions of the CVBEM in two-dimensional high aspect ratio domains and application to 3 dimensions are discussed. (Received September 26, 2017)