1125-65-2229 **Bryce D Wilkins*** (bryce.wilkins@usma.edu), United States Military Academy, Department of Mathematical Sciences, PO Box 4440, West Point, NY 10996, and **Randy Boucher** (randy.boucher@usma.edu), United States Military Academy, Department of Mathematical Sciences, PO Box 4440, West Point, NY 10996. *An Unsteady Two-Dimensional Complex Variable Boundary Element Method for Modeling Heat Transport Problems.*

Solving potential problems, such as those that occur in the analysis of steady-state heat transfer, electrostatics, ideal fluid flow, and groundwater flow, is important in several fields of engineering, science, and applied mathematics. One technique for numerically approximating the solution to these potential problems is the Complex Variable Boundary Element Method (CVBEM). Typically, applications of the CVBEM have been limited to steady-state solutions of the Laplace equation. In this work, by adding a time component, the CVBEM is extended to modeling applications of the two-dimensional transient Laplace equation.

The problem considered is a rectangular two-dimensional domain. The underpinning of the modeling approach is to resolve the global problem into two subproblems; a transient and a steady-state subproblem. The transient component of the problem is modeled by a generalized Fourier series expansion. The steady-state component of the problem is solved by application of the CVBEM. The global solution is the sum of the solutions from the two modeling components.

The mechanics and solution success of the new technique of coupling a generalized Fourier series and a CVBEM approximation in solving the two-dimensional transient Laplace equation are discussed. (Received September 20, 2016)