1113-35-303 **Yuri A. Antipov** (antipov@math.lsu.edu) and **Ashar Ghulam*** (aghula2@lsu.edu), Department of Mathematics, Louisiana State University, Baton Rouge, LA 70803. *Method of the Riemann-Hilbert problem for the Helmholtz equation in a semi-strip.*

The Helmholtz equation in a semi-infinite strip subject to the boundary conditions $[U_j(\partial/\partial\tau)\partial/\partial n + \mu_j]u = f_j$ on side j $(j = 1, 2, 3)$, is analyzed. Here, $\partial/\partial\tau$ and $\partial/\partial n$ are the tangential and normal derivatives, U_j are order-m_j differential operators with constant coefficients, μ_j are constants, and f_j are given functions. The problem is transformed into an order-2 vector Riemann-Hilbert boundary value problem of the theory of analytic functions. It is shown that if the polynomials $U_j(s)$ have only even powers of s, then the vector Riemann-Hilbert problem admits a closed-form solution. The particular case when $U_j(s)$ are constants is analyzed in detail. In this case the representation formulas for the solution are reducible to the ones obtained by the finite integral transformation and solution of the associated Sturm-Liouville problem. Both methods ultimately require determining roots of the same transcendental equation. They are found by quadratures on applying the Burniston-Siewert method and solving a certain Riemann-Hilbert problem on two segments. (Received August 25, 2015)