

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Free surface waves on a horizontal shear GARY LAPHAM, Maine Maritime Academy, JOHN MCHUGH, University of New Hampshire — Free surface waves on a non-uniform mean flow are considered. The mean flow $U(y)$ varies with the transverse coordinate y but not the vertical. The domain is bounded on one side by a flat rigid vertical wall and unbounded on the other side. The mean flows considered are nonzero near the vertical wall and approach zero far from the wall, e.g. $U = e^{-\gamma y}$. For large y where the mean flow is near-zero the waves are merely irrotational Stokes' waves. Near the wall the mean flow and the waves are rotational but still inviscid. Linear solutions are obtained for several canonical cases with a nonuniform coordinate transformation that converts the free surface boundary condition into a Bessel equation. A Bessel expansion provides the velocity components, then wavespeeds are obtained numerically. Steady waves are found with wavespeeds outside the range of U , matching previous results in a flow bounded on both sides.

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Date submitted: 02 Aug 2013

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