

Abstract Submitted  
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**Dispersion relation for waves on arbitrarily depth-varying shear current: a numerical scheme**<sup>1</sup> SIMEN . ELLINGSEN, YAN LI, Norwegian University of Science and Technology (NTNU) — In the coastal zone, currents can be strongly sheared in the vertical direction, which affect the dispersion properties of surface water waves in a complicated manner. Oceanographic wave models depend on accurate dispersion calculation, as do predictions of wave forces on vessels and structures. We present a new numerical method for calculating the dispersion relation of linear waves propagating on a horizontal shear current whose magnitude and direction may vary arbitrarily with depth. The method compares favourably with existing methods: it is more efficient and simpler to implement than the classical piecewise-linear approach, and has much higher and well controlled accuracy compared to semi-analytical approximation relations, at only moderately greater cost. We also present the theory by which any numerically calculated dispersion relation can be used to calculate waves from an arbitrary time-dependent surface pressure source.

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