Abstract Submitted
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Practical Modeling of Internal Wave Tunneling in Variable Ocean Currents[1] JAMES ROTTMAN, SAIC, DAVE BROUTMAN, CPI — The purpose of this research is to develop a practical Fourier-ray method for computing the propagation of internal waves through current fluctuations in the upper ocean. In particular, we are concerned with modeling wave transmission through thin evanescent layers, a process that cannot be described by ray theory alone. We discovered that the maximum transmission is associated with waves that have four, not two, nearby turning points. The theory for four turning points is not well advanced and is far less practical for computation. For these waves we use a numerical integration of the Taylor-Goldstein equation that is new is two ways. First, we only apply the numerical integration to a small portion of the wavenumber spectrum, namely those components with more than two nearby turning points. We can vectorize the numerical integration of these components over horizontal wavenumbers. Secondly, we do not attempt to find the long-time steady-state solutions, which can have resonant singularities, but instead we find the numerical solution for one reflection from (and one transmission through) the evanescent region, and then add in phase-shifted copies of this solution to account for the contribution for further reflections.

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