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Resonant interaction of waves generated by a moving/oscillating body in a two-layer density stratified fluid MOHAMMAD-REZA ALAM, YUMING LIU, DICK K.P. YUE, Massachusetts Institute of Technology — The problem of nonlinear interactions among surface and interfacial waves generated by an oscillating-translating body in a two layer density stratified fluid is studied both analytically and numerically. In two dimension, according to linear theory, an oscillating-translating body in a two layer density stratified fluid generates up to eight waves depending on the dimensionless frequency, Froude number, density ratio and the depth ratio. When nonlinear effects are considered, we show that unlike in a homogeneous fluid, the second-order interactions of two of these ship waves may become resonant for a finite number of special values of the dimensionless frequency. Under the resonance, a new free wave is generated, and travels in the same or opposite direction of the original ship waves. The effects of such resonant interactions on the wave pattern and resistance of a ship are investigated. This study may have implications to the detection of vehicles in littoral zones using remote sensing.

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