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Self-similar structure of a corner wave at short times[1] PABLO MARTINEZ-LEGAZPI, JAVIER RODRIGUEZ-RODRIGUEZ, Carlos III Univ. of Madrid, Spain, JUAN C. LASHERAS, UC San Diego — We study theoretically the flow near the corner of a vertical flat plate partially submerged across an uniform stream. When the Froude number is large enough, a three dimensional wave forms at the corner of the plate which evolves downstream in a similar way as a time-evolving two dimensional plunging wave. We have performed pressure-impulse asymptotic analysis of the flow near the origin of the corner wave to describe the initial evolution of the wave and to clarify the physical mechanism that leads to its formation. The analysis shows that the wave crest exhibits a self similar behavior at short times. After this self-similar stage, the wave crest detaches plunges following a nearly ballistic trajectory. The results improve our computational modeling of the flow near the stern of a high-speed surface ship, providing the initial condition needed for CFD simulations to properly capture the behavior of these stern waves.

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