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Nonlinear waves through vegetation in coastal regions CLINT WONG, University of Oxford, PHILIPPE TRINH, University of Bath, JON CHAPMAN, University of Oxford — The study of fluid flows interacting with vegetative structures in coastal regions presents a significant challenge on account of its multi-scale nature. Hence, much of the previous work has been confined to the small-amplitude regime. In this talk, we show how compact asymptotic reductions allow us to study nonlinear surface waves over vegetative regions. For example, for plants over a horizontal bed, previous work on linear waves predicts a quadratic decay in wave amplitude. Our multiple-scales analysis on cnoidal waves provides new accurate predictions on how amplitude and wavelength modulate along the coastverified with finite-element simulations. This work is in collaboration with the US Army Corps of Engineers and HR Wallingford.

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