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Hysteretic
Faraday waves[1] NICOLAS PÉRINET, CLAUDIO FALCÓN, DFI-FCFM, universidad de Chile, JALEL CHERGUI, LIMSI-CNRS, SEUNGWON SHIN, Department of Mechanical and System Design Engineering, Hongik University, DAMIR JURIC, LIMSI-CNRS — We study with numerical simulations the two-dimensional Faraday waves in two immiscible incompressible fluids when the lower fluid layer is shallow. After the appearance of the well known subharmonic stationary waves, a further instability is observed while the control parameter passes a secondary threshold. A new state then arises, composed of stationary waves with about twice the original pattern amplitude [1],[2]. The bifurcation presents hysteresis: there exists a finite range of the control parameter in which both states are stable. By means of a simple stress balance, we show that a change of the shear stress can explain this hysteresis [1]. Our predictions based on this model are in agreement with our numerical results.

[1] X. Li, Z. Yu and S. Liao, Phys. Rev. E 92, 033014 (2015)
[2] N. Périnet, C. Falcón, J. Chergui, D. Juric and S. Shin, Phys. Rev. E 93, 063114 (2016)

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