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Water-wave diffraction by small undulation on a porous oceanbed in the presence of surface tension in a two-layer fluid SUBASH CHAN-DRA MARTHA, SRIKUMAR PANDA, Indian Institute of Technology Ropar, India — The problem involving wave scattering in a two-layer fluid due to small bottom undulation on the porous ocean-bed is investigated within the framework of twodimensional linearized water wave theory in the presence of surface tension at the upper free surface. In each layer it is assumed that the flow is irrotational and the fluid is inviscid and incompressible. In such a two-layer fluid there exist waves with two different modes, one with lower wave number propagate in the upper layer whilst those with higher wave number propagate in the lower layer. An incident wave of a particular mode gets reflected and transmitted by the undulating bottom into waves of both modes. By employing perturbation analysis in conjunction with Fourier transform method, the governing BVPs are solved and the reflection and transmission coefficients are obtained in terms of integrals involving the shape function c(x) representing the bottom undulation. These coefficients can be evaluated once the shape function is known. One special type of undulating bottom is considered as an example to evaluate the related coefficients in detail. These coefficients are depicted graphically to demonstrate the transformation of energy between the two different modes and also to validate the theoretical observations.

> Subash Chandra Martha Indian Institute of Technology Ropar, India

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