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Critical Steady Surface Waves of Idea Fluid over a Bump with Surface Tension JEONGWHAN CHOI, SANGWON LEE, JOONKYOUNG KIM, Korea University, SUNGIM WHANG, Ajou University — The paper deals with steady forced surface waves propagating on a two-dimensional incompressible and inviscid fluid with a small bump placed on a rigid flat bottom. If the surface tension coefficient T on the free surface is not zero and the wave is moving with a constant speed C, the wave motion is determined by two non-dimensional constants, F =gh and = T/(gh2), where g is the gravity constant and h is the height of the fluid at infinity. It has been known that F = 1 and = 1/3 are the critical values of F and , respectively. In the critical case F = 1 + 12 and = 1/3 + 1 with ¿ 0 a small parameter, a time-dependent forced Kawahara (F-Kawahara)equation is derived to model the wave propagation on the free surface and the steady F-Kawahara equation is studied both theoretically and merically. It is shown that the steady F-Kawahara equation has many different kinds of one and multi-hump solutions when 1 and 1 vary. In particular, for a fixed 1, there is a 0 ¡ 0 such that if 1 ¡ 0, two one-hump steady solutions can be obtained, one with small amplitude and the other with large amplitude. By using the unsteady F-Kawahara equation, it appears that the small one-hump solution is stable while the large one is nstable. In addition, two-hump solutions are unstable.

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