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**Theoretical study of a supercritical free surface flow problem
under superficial tension effects**

We use the implicit function theorem on Banach spaces to prove the existence and the uniqueness of the solution of a supercritical irrotational, bidimensional and stationary free surface flow over an obstacle (lying on the bottom of a plane channel). We take into account gravity and effects of superficial tension. We write Bernoulli's equation on the free boundary so the difficulty is twice: a non-linear equation written on an unknown boundary.

The Banach spaces chosen ensure the asymptotic behavior of the solution.