سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

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شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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سامية محمد مصطفى

بالرسالة صفحات لم ترد بالأصل

ALEXANDRIA UNIVERSITY

FACULTY OF ENGINEERING

POTENTIAL FLOW PROBLEMS

A thesis submitted to the
Faculty of Engineering for the Degree of

Doctor of Philosophy

in Engineering Mathematics

By

Emad Alfred Fahmi

Supervised by

Prof. Dr. ***Youssef Z. Boutros***

Prof. Dr. ***Mohammed N. Anwar***

Prof. Dr. ***Sarwat N. Hanna***

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We certify that we have read this thesis and that our opinion it is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy in Engineering Mathematics.

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SUMMARY

For many years the effect of the shape of the bottom on surface wave has received considerable attention. Several methods, both experimentally and theoretically have been used to solve this problem.

In this thesis, all problems are solved under the assumption that the fluid is inviscid and incompressible and that the flow is two-dimensional, irrotational and steady.

Chapter I mentioned a historical survey for the subjects dealing with the flow over various bottom topographies.

The principal mathematical methods are reviewed in Chapter II such as Linearization method, Perturbation method, Relaxation method, Finite difference method, Finite element method, Boundary-integral equation method, Kantorovich method, Hilbert's Method, Hodograph method and Cauchy integral equation method.

The free surface flow past a submerged periodic bottom of different shapes is considered in Chapter III. Following the linearized method suggested by Thomson and Lamb the free-surface profile is obtained for the supercritical and subcritical cases.

The effect of the surface tension is taken into account for the two kinds of flow. The parameters governing the flow such as the Froude number F, the periodic length L and the shape of the bottom are discussed in both cases of the presence or absence of the surface tension.

The results are in good agreement with those obtained by other previous methods.