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Stream Function Wave Theory 에 관한 考察

明知大学 土木工学科

專任講師 呂運光

助教授 片宗根

ABSTRACT

It is well known that small amplitude wave theory, a first approximation to the complete theoretical description of wave behavior, yields a maximum of useful information for a minimum investment in mathematical endeavor.
But, if the wave amplitude is large, the small amplitude considerations are not valid, and finite amplitude wave theory which retains higher-order terms to obtain an accurate representation of the wave motion is needed.

These finite amplitude wave theories can be classified into two groups: One is the analytic theory and the other is numerical theory.

The stream function wave theory, one of the numerical methods, was developed by Dean for use with asymmetric measured wave profiles and with symmetric theoretical wave profiles. Dalrymple later improved the computational procedure by adding two Lagrangian constraints so that more efficient convergence of the iterative numerical method to a specified wave height and to a zero mean free surface displacement resulted.

This paper introduces in details the Dean and Dalrymple Stream Function Method in case of the symmetric theoretical wave, because in design purposes, wave height and wave period are given.