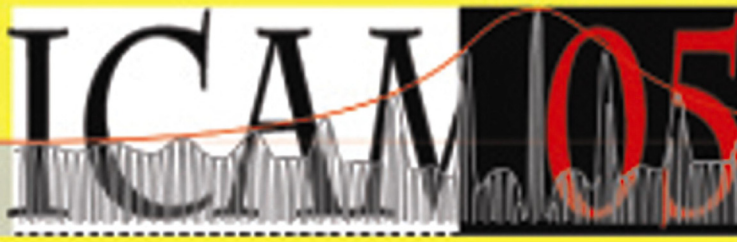

Proceedings of International Conference on Applied Mathematics 2005

22-26 AUGUST 2005
AULA TIMUR
ITB BANDUNG INDONESIA

ISBN: 90-365-2244-7

ON THE BREAKING PARAMETERS OF SIGNALLING PROBLEM

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Abstract: This research is motivated by the requirement of hydrodynamic laboratories to generate extreme waves for testing ships in steep, large amplitude wave fields. It is also desired that such a wave will not break in its spatial evolution before reaching the tested ship position. For this purpose, finding criteria that determine if wave breaking will occur is important.

In the study of wave breaking, Banner et.al. [1] proposed a non-dimensional quantity that can be interpreted as the dynamic of the maximal square of wave steepness over the spatial domain. The investigation uses a simulation model to calculate the evolution of ocean waves for a given initial profile that depends on certain parameters. A threshold value for the quantity that marks the breaking of waves was found.

Different from Banner's initial value problems, in this contribution we will consider the *signalling problem*: a time signal is prescribed to a wave maker in a wave tank that produces propagating waves running in initially still water. The aim is to observe the resulting nonlinear effects on the waves and to study in which cases the waves will or will not break. This also leads to a threshold value for the steepness of signal at wavemaker and for adjusted Banner's quantity as the breaking parameter of signalling problem. In this observation we consider similar classes of waves as in [1], namely Bichromatic waves and Benjamin Feir-waves, and investigate the evolution by using a numerical simulation code HUBRIS developed by Westhuis [2]. The validity of this code has been tested against laboratory experiments. The result of our investigations is that for both classes the parameters of wave breaking are more extreme in the signaling case than in the case of Banner's initial value problem.

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