

The XXXVI International School of Hydraulics, 23-26 May 2017, Jachranka, Poland

Lattice Boltzmann method for the numerical simulations of the melting and floating of ice

A. BADARCH¹ and H. TOKUZO²

¹ Graduate School of Engineering, Nagaoka university of Technology
1603-1 Kamitimioka, Nagaoka 940-2188, Japan
e-mail: ayur_426@yahoo.com

² Department of Civil and Environmental Engineering, Nagaoka University of Technology
1603-1 Kamitimioka, Nagaoka 940-2188, Japan

ABSTRACT

In this paper, an extension to a recently introduced model for liquid-solid phase changes in free surface flow is explored by adding a new floating body simulation algorithm. The algorithm, based on the immersed boundary formulation of the Lattice Boltzmann method, is applied over a time dependent, arbitrary shaped, floating or immersed body in a free surface flow. Here, simulation and laboratory experiment of a floating ice cylinder was carried out to examine the accuracy of the proposed model. Numerical results confirm that the proposed algorithm satisfies the mass conservation, which has been difficult to be handled, and computes the involved free surface and heat transfer with reasonable accuracy.