Osaka University
Graduate School of Engineering
Department of Naval Architecture & Ocean Engineering

Hydro-Seminar

by Lab. of Floating-Body Dynamics in Waves

The speaker in the 43rd Hydro-Seminar is

Professor Yonghwan Kim

Department of Naval Architecture & Ocean Engineering
Seoul National University, Seoul, Korea
Specially Appointed Professor of Osaka University

Date: Friday, 6 October, 2017
Time: 10:30 – 12:00
Venue: S1-412 (Lecture room, 4F of S1 building)
Suita Campus, Osaka University

Computational Methods and Application Procedure for Fatigue Assessment due to Ship Structural Hydroelasticity in Seaways

Abstract

With regards to ship structural hydroelasticity, there are a few major concerns, e.g. fatigue analysis, extreme load prediction, and local impact load prediction. When quasi-steady loads are applied on ship structure, we can take an advantage of spectral method. However, when s ship experiences also impulsive forces, the signals of hydrodynamic loads become very much nonlinear and there is not many choices for signal analysis. This presentation introduces the development of a practical procedure and its component elements for the analysis of hull structural hydroelasticity in seaways and the corresponding fatigue assessment. The procedure is an integration of ship motion, structural vibration, stress, and fatigue analyses. For the ship motion and structural vibration analyses, a fully coupled hydroelastic approach is adopted in time domain. The approach is composed of a 3-D Rankine panel method, a 2-D generalized Wagner model, and a 1-D or 3-D finite element method. Then, springing and slamming-whipping are considered in the analysis, and computational results are systematically validated by comparing with experimental results. As a result, a set of high-fidelity procedures for hydroelastic response and fatigue analyses of ship structure is introduced. Finally, the proposed procedures are applied to an ultra large containership.

The Speaker: Professor Yonghwan Kim

Professor Kim graduated Seoul National University for his bachelor and master degrees, and got a PhD degree at MIT. Currently he is a chair of the Department of Naval Architecture and Ocean Engineering at Seoul National University, and the director of Advanced Marine Engineering Center and the Lloyd's Register Foundation Center. Also he is a specially-appointed professor of Osaka University.

His primary research areas marine hydrodynamics, including motion responses of ships and offshore structures, sloshing, ship hydroelasticity, greenship technology, and naval hydrodynamics. He is the author of more than 350 technical papers, and he is serving for several international journals as editor-in-chief, associate editor, and editorial board member.

He is a member of Korean Academy of Engineering and Fellow of RINA. Also he was chosen as the Distinguished Visiting Fellow of Royal Academy of Engineering, UK, in 2015~2016.

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