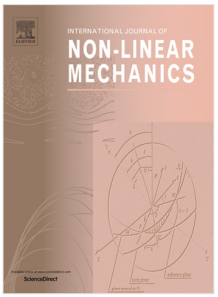
Accepted Manuscript



Nonlinear dynamical analysis of moored floating structures

Kun Wang, Guo-Kang Er, Vai Pan Iu

PII: S0020-7462(16)30294-3
DOI: https://doi.org/10.1016/j.ijnonlinmec.2017.10.025
Reference: NLM 2929

To appear in: *International Journal of Non-Linear Mechanics*

Received date : 4 November 2016
Revised date : 24 August 2017
Accepted date : 30 October 2017

Please cite this article as: K. Wang, G. Er, V.P. Iu, Nonlinear dynamical analysis of moored floating structures, *International Journal of Non-Linear Mechanics* (2017), https://doi.org/10.1016/j.ijnonlinmec.2017.10.025

Nonlinear dynamical analysis of moored floating structures

Kun Wang*, Guo-Kang Er, Vai Pan Iu

Department of Civil and Environmental Engineering, University of Macau, Macau SAR, P. R. China

Abstract

The nonlinear vibrations of two-dimensional moored floating structures under horizontal sinusoidal excitation are studied. The mooring lines are connected to the floating structure and fixed to the sea bed. The nonlinear equations of motions of the mooring lines are formulated using the cable elements formulated based on the extended Hamilton principle. The floating structure is considered as a rigid body with three degrees of freedom. Then the equations of motion of the floating structure and mooring lines are formulated as a whole through their connection conditions. Finally, the equations of motion of the whole structure are analyzed numerically. The influences of different sag-to-span ratio and inclined angle of the mooring cables on the responses of the floating structure are studied. The response amplitudes of the moored floating structure are also studied as the external frequency changes.

Keywords: Floating structure, mooring lines, connection conditions, cable element

*Corresponding author. Tel.: +853 63584620.
Email address: yb37402@umac.mo (Kun Wang)