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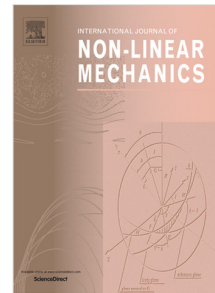
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# Nonlinear dynamical analysis of moored floating structures

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## 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

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