# Time Domain Simulation of a DP Semisubmersible in Large Nonlinear Randon Waves

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## Abstract

Dynamic Positioning is proved cost effective in very deepwater applications. We discuss a true dynamic time-domain simulation method for a fully DP assisted semi-submersible. The computational algorithm is developed with a simplified numerical wave tank. Boundary - integral method with time-integration of boundary condition is used. Nonlinear effects associated with a large-amplitude wave and other relevant nonlinearity that would affect the motion of the vessels are included well in the algorithm. Morison elements and nonlinear drag associated with braces are included in the true sense with no approximation. Instantaneous position and orientation of the vessels are considered in the force calculation.

The most advanced computational program is used with fully DP balanced station keeping vessel. The motion and animation results of the vessel are presented for a practical Semi-submersible drilling rig.

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