

RESUMO N° 131

APPLICATION OF LMS METHOD TO SOLVE NON-DYNAMICS OF CABLE EQUATION. COUPLING WITH SECOND ORDER WAVE SOLVER AND APPLICATION ON OFFSHORE STRUCTURES

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Today, offshore technology has great relevancy. This leads to develop new techniques and methods to solve dynamics of devices which are placed on sea. Cable dynamics can be considered as special one into offshore technology field. Moorings are formed by cables which permit floating offshore structures to be placed on a fix location into the ocean. Numerical methods are required to solve the non-linear dynamics of mooring cables. Mooring analysis can be considered as structural dynamic problem. Classical models which used quasi-static modelling for mooring cables are based on catenary lines to solve dynamics. This work presents an alternative strategy for solving the non-linear mooring behaviour, based on Non-Linear Finite Element Method (NFEM) approach. So, numerical integration is carried out using Linear Multistep Method (LMS) based on Bossak-Newmark scheme. Afterwards, formulation for second order wave equations used to describe the free surface of the ocean is shown. A procedure for solving the coupling between the loads obtained by the non-linear cable model, the second order wave model and other external forces is then described. Some validation examples of the simulated non-linear cable, comparisons and validation with results obtained by other authors are also presented. An application on several floating conceptual platform will be carry out using fully coupled simulations taking into account most of external loads acting on platform and finally some relevant conclusions will be obtained.