

# DYNASIM III: Computational methods for mooring lines and risers analysis in Dynasim software (DOOLINES Module)

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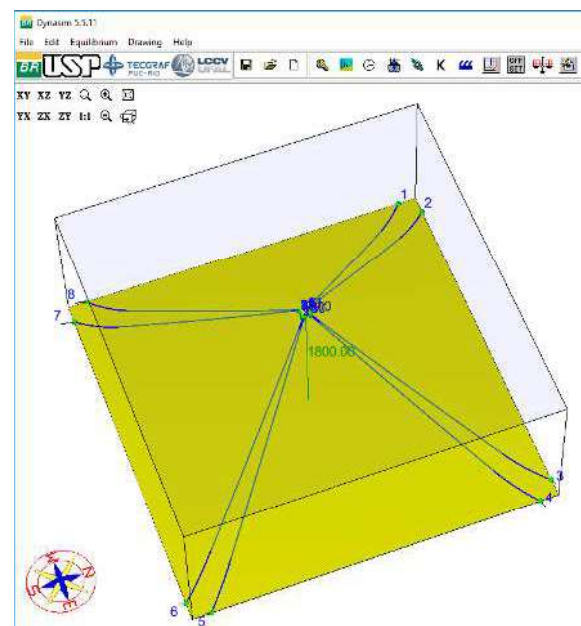
## Research & Development Project

Duration: 48 months (In progress)

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## Introduction

DOOLINES is a simulation module of the Petrobras DYNASIM software that allows the static and dynamic analysis of mooring lines and risers using the Finite Element Method (MEF), taking into account the action of waves, current, buoys, clumps, among other effects. DYNASIM is a computational system that integrates three different modules for the nonlinear time domain dynamic analysis of offshore systems: preprocessing, simulation and postprocessing. Such computational systems have a fundamental role in the design, installation and operation stages of this type of structure, because they allow the engineer to anticipate the behavior of the designed structure under different loading conditions. Thus, this project intends acting on the cost reduction of the submarine arrangement design of risers through its interaction with the mooring system, to optimize it while maintaining safety and reducing materials.



## Methodology

Each activity in this project is typically initiated with a scientific literature review, aiming to identify available formulations for the proper treatment of the phenomena considered adapting them when necessary. Additionally, every new DOOLINES implementation is followed by verification tests from existing and proved examples that present analytical or numerical solutions in a similar computing system. Only after proper validation, the new implemented DOOLINES methods are integrated into the full version of the DYNASIM software.

## Results

This project developments contribute to the knowledge about numerical modeling of mooring lines and risers systems. The results are presented in technical reports. It is also intended to contribute to the training of human resources, with scientific and technological qualifications for the oil and gas industry. Additionally, it contributes with computational resources employed to carry out new research.