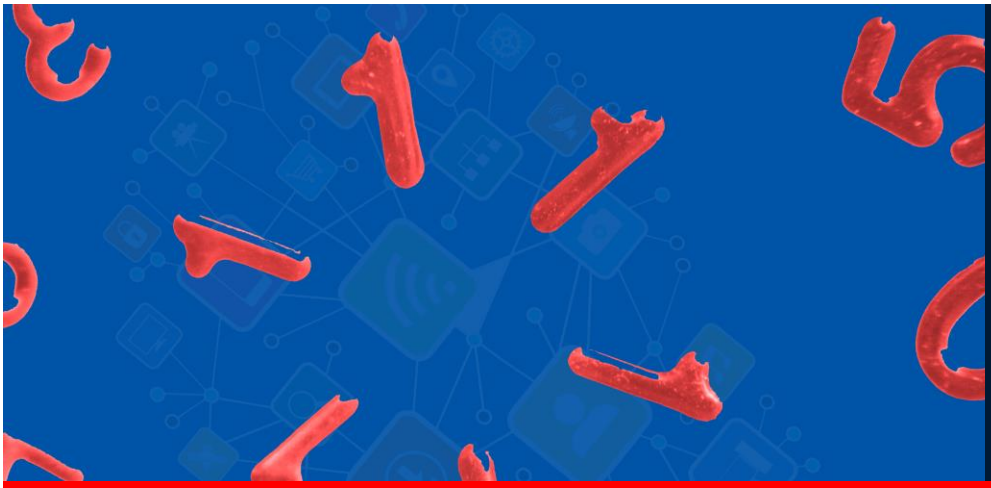

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Focus on technical software

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"The devil is in the details"... This is even more true when speaking about software development.

Nowadays, technical software cover an ever more central position in engineering and design activities; often technical challenges need implementation of complex physical models and simplified analytic methods do not provide sufficiently accurate representations of reality.

Consequently, software tools are in some cases seen as the main actor of an engineering and design process.

The engineering/technical tools should have al least five main requirements:

1. be scientific
2. be tested
3. have industrially manageable numerical computation time
4. be user friendly and traceable
5. allow the user understanding how the software is interpreting physical reality and how its representation is numerically implemented and solved

A fundamental player in the engineering process is sometimes in the shadow: the software user. It is our opinion that the software should be a calculation tool that allows the user to be in total control of the numerical implementation and have the freedom to change any of its parameters, to model and represent in the most accurate or technically sound way the physics of the problem.

During the years, we have extensively used a wide range of engineering commercial software and got to know their strengths and weaknesses but, in most if not all cases, we have had to deal with major drawbacks, related to both flexibility and unclear/inefficient/unsuitable physical and mathematical models implemented.

Oceanira has been founded with a specific focus on R&D and software development aiming at:

1. holding and maintaining a deep knowledge in physical modelling
2. proposing solutions tailored for each complex technical solution and addressing the specific physical problem
3. having a complete understanding of numerical tools theoretical backgrounds, approximations and limitations

For all these reasons, we have decided to take a challenging step forward and develop tools based on up-to-date theories that will allow us, but potentially other users who share our ideas and concerns, to finally have extensive control over the technical software.

We are embarking on this extremely demanding and difficult journey with the strong belief that this effort will also increase Oceanira's in-depth knowledge of offshore structures numerical modelling and mathematical theories and consequently improve the quality and technical level of the services we provide to our clients.

OUR LATEST PROJECTS

Project	Client
Consultancy for an unconventional FLNG mooring system design and analysis	DV Offshore
Technical assistance for the analysis of mini-LNG berthing and offloading systems	D'Appolonia
Assistance for FE modelling	Interprogetti Genova
Abandoned drilling pipe analysis (ENI Congo)	RINA Services
Technical assistance for bid evaluation (ENI FPSO GHANA)	RINA Services

Three main research and development fields have been identified by Oceanira, that will allow the company to fill the gap with the major competitors in the industry:

1. multibody quasi-dynamic hydro-mechanical simulation
2. radiation diffraction analysis
3. second order inviscid calculation of loads: simplified approach vs exact solution

The spotlight of the development team has already switched on the multibody quasi-dynamic hydro-mechanical time domain solver and simulator. Some of the tool capabilities will be:

1. quasi-dynamic mooring analysis
2. simulation of marine operations (for instance, deck mating and launch of jackets)
3. simulation of multibody systems in complex environmental actions (for example side by side mooring analyses with internal tanks, multibody liftings or offshore operations)

Among the features that can be identified in the technical specification, we can mention:

1. four types of solutions body motions (single set of equations for all motion effects, wave frequency motion solved separately from low frequency motions, superimposition of RAOs on low frequency motions, imposed time histories)
2. detailed control on the forces to be included in low frequency, wave frequency and high frequency equations of motion
3. inclusion of Morrison force formulations
4. non linear hydrostatic and Froude-Krylov calculation for diffracting bodies
5. specific connections such as deck mating units, rails and slides
6. diffracting bodies second order forces using both sum and difference full QTFs
7. multiple spectra and wave spreading

The software core will be coded in Fortran 95 programming language, using the most advanced compiling and parallelization options, such as OpenMP, and giving the user the possibility of exploiting all available computational power.

Together with the preparation of the specification of the mechanical solver (the name of which is still being debated!), Oceanira is busy developing smaller software tools, available and useful for everyday naval architecture tasks.

This bulleting focuses the attention on the Oceanira tool STOCLIN, "Stochastic linearization of damping".

Damping linearization is a classical problem that the naval architect has to tackle during different activities, from analysis of marine transportations to mooring.

Stochastic linearization method is an industry standard which is not always implemented in offshore and naval hydrodynamic/frequency domain dynamic software, and, when it is, a specific licensing option is often required.

To fill this gap we decided to develop STOCLIN and we have added a feature that is not integrated in most of the commercial software: the possibility to linearize cubic damping. This, we feel, could be extremely useful especially for detailed models calibrated thought model tests.

STOCLIN integrates 14 analytic wave spectra such as JONSWAP, Gaussian, Ochi-Hubble, ITTC, Wallops, and it has the possibility to include wave spreading, multi directional spectra and cross seas.

The software solves the coupled 6 DOF frequency domain equations of motion but the user is free to define data for a limited number of degrees of freedom. This flexibility enables to greatly reduce the number of inputs when desired.

A graphical interface allows to quickly check the wave spectrum and spreading discretization together with the output RAOs.

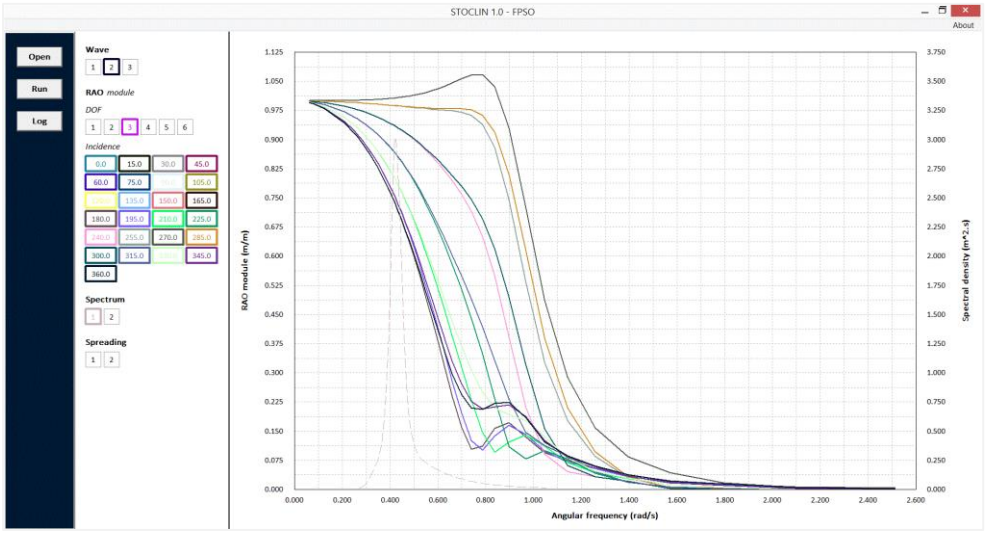
The software can be useful when the naval architect deals with a large number of sea states where a quick postprocessing of RAOs and spectral response including non linear damping and/or additional stiffness is needed, for instance in fatigue analyses.

All software developed by Oceanira is carefully tested and completely quality checked by means of intensive black box tests, comparison of results with physical model tests, data available in literature and with outputs of other commercial software.

Our software development team is happy to meet any clients' need to customize the software in order to provide bespoke solutions that can save engineering time, resources and assure quality standard.

To reserve a free demo version of STOCLIN or for more information on our software development, please contact:

software@oceanira.com



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