Preliminary program of the 25th DEGA workshop Physical Acoustics on the topic of "Underwater acoustics" (October 17/18, 2019, Bad Honnef near Bonn, Germany)

"On the efficient use of the hierarchical matrix BEM for target echo strength simulations"
Olgierd Zaleski, Boris Dilba, Henning Lohmann
Novicos GmbH, Hamburg, Germany

Abstract:
By means of the hierarchical matrix compression the complexity for the computational and memory requirements of the BEM are effectively reduced. However, for three-dimensional high frequency acoustic problems the effort grows with increasing frequency. In this contribution the application of different hierarchical matrix compression techniques for the target echo strength evaluation of a submarine is outlined. In addition to the discussion of the frequency dependent scaling behaviour of memory requirements and computational costs, efficient solution strategies are presented.

"Underwater noise simulations for the defense research vessel WFS Planet"
Stefan Semrau
DNV GL SE, Hamburg, Germany

Abstract:
Content of this presentation are the results of the study "Numerical waterborne noise prognosis including propeller cavitation, part 2." Within this study DNV GL's own SEA based underwater noise prognosis program was extended to include hydrodynamic effects of the propeller. The hydrodynamic calculations were carried out with the in-house calculation program NV571-2010, which works with the so-called "Tip-Vortex Index" in order to be able to estimate the influences of the propeller tip vortex. The methods used and the comparison with measurement data provided by the WTD71 are presented.

"Estimating the radiated underwater noise of seagoing platforms: the physics behind signal analytic approaches"
Carsten Zerbs, Andreas Müller, Ingmar Pascher
Müller-BBM, Hamburg, Germany

"BURNSi - Benchmark Underwater Radiated Noise Simulations"
Hans Hasenpflug
Center for Ship Signature Management (CSSM), Kiel, Germany and The Netherlands
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“Underwater acoustics - Experiments in water basins”
Arne Stoltenberg
Bundeswehr Technical Center for Ships and Naval Weapons, Maritime Technology and Research (WTD 71), Kiel, Germany
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“Offshore pile driving noise: General setup and capability of state-of-the-art prediction models in 2D and 3D”
Jonas von Pein, Stephan Lippert, Otto von Estorff
Technical University Hamburg, Hamburg, Germany

Abstract:
The foundations of offshore constructions, like e.g. wind turbines, are normally attached to the sea bed by huge steel piles. Due to the high hammer energies that are needed to drive the piles into the soil, a considerable amount of noise is emitted into the water column. Subsequently, many countries have introduced legal restrictions for the underwater noise to protect the marine wildlife. Reliable and accurate prediction models to enable a prognosis of the noise levels prior to construction are therefore necessary to assess the noise emission and configure possible mitigation measures. Numerical prediction models have proven to be especially capable for this task, as they allow for a detailed consideration of the applied hammer technology, the pile geometry, possible noise mitigation measures as well as the specific propagation conditions in both water column and soil. This contribution explains the general setup of state-of-the-art numerical prediction models. Beside typical 2D models, also 3D approaches to consider distinct bathymetries, like e.g. underwater canyons or shore lines, are addressed. Examples comparing predicted and measured noise levels are used to demonstrate the capability and additional value of numerical prediction models for offshore pile driving noise problems.

“Active manipulation of acoustic signature”
Delf Sachau, Hendrik Brüggemann (Helmut Schmidt University, University of the Federal Armed Forces, Hamburg, Germany)
Anton Homm (Bundeswehr Technical Center for Ships and Naval Weapons, Maritime Technology and Research (WTD 71))

Abstract:
The underwater radiated noise of maritime systems is known as acoustic signature and can be used for detection and identification of naval vessels. Structural and mechanical differences between different systems lead to characteristic signatures such that a clear identification is possible. This is in conflict with strategic interests in the military sector to hide the identity of a naval vessel.
To prevent a naval vessel from identification a process has to be developed that modifies the signature by the use of active methods without increasing the distance of revelation. In this study a system has to be integrated to a scaled model of a naval vessel that uses actuators assembled to the hull of the model to generate additional sound that superimposes the sound field according to the specifications.

“Hydroacoustic noise emission of hubless propellers”
Matthias Witte, Max Hieke, F.-H. Wurm
University of Rostock, Rostock, Germany