ACOUSTICS2008/2798
Numerical acoustic modeling code applied to sonar transducers and arrays : review and perspectives

Gerard Vanderborck

Thales Underwater Systems SAS, Acoustic Department, 525 route des Dolines, BP 157, 06903 Sophia Antipolis Cedex, France

In this paper a review based on several examples of Thales Underwater Systems (TUS) design and modeling of transducers will be presented : several examples like wide band free flooded ring flextensional and bender transducers, high frequency transducers with thermal analysis modeling included, will be discussed. An approach of the problem of the mutual impedance computation appearing in array modeling will be also presented.

Tus used since several decades FEM - BEM codes to design acoustic transducers and arrays. The perspectives in transducer and array modeling will be indicated like the possibility to take into account the non-linearities in the material, the time dependent problem and the use of new kind of piezoelectric material will be also discussed. Specific aspect of single crystal transducers modeling will be presented.

The increase of the computing power will also permit to take into account the complex problem of the interaction between transducers in an array (mutual impedances).

We will conclude on complex ultra wide band antenna (based on strong transducers interactions) optimization and the associated modeling architecture issues.