Erasmus Mundus WAVES

Report

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Work developed in the scope of the course
COURSE NAME

2023/2024

Contents

1 Introduction

The following assignments were the main interest for exploration in order to progress the current state of the work:

- reconstruction of the bubble frequency response from the received signal

- simple version of the multiple scattering between bubbles

- research on the available mesurement procedures within the literature of the bubble experiments

2 Theoretical part

Reconstruction of the bubble frequency response from the received signal

It will allow demonstrating the ability to invert the model to find individual bubble contributions from compund analysis. The following equation **??** was the base of the calculations:

$$R = T \times H + N \tag{1}$$

where R is a received signal, T is a transmitted signal by sonar, H is frequency response of the bubble, N is an added background noise.

Simple version of the multiple scattering

The concept lies in considering each bubble as a source when it scatters an incident wave. Therefore, each bubble will have an influence on another, and also receives a sum of all scatterrings from other bubbles.

Bubbles have to be sufficiently far from each other in order not to be dependent on each others bubble frequency response.

Research on the available mesurement procedures within the literature of the bubble experiments

- Sound signal: narrow band pulse, chirp, noise

- Sonar position: from top, vertical, horizontal

- Bubbles location: in the center of the experimental pool

- Bubble characteristics: emitting a single bubble of the specified radius; a row of bubbles; creating a bubble flare;

Other things which are important for taking into account are:

- Response of the transducer can influence the received signal

- Near field radiation implementation for measurements with a spherical radiation against the plane wave in a far field

Further set of things which are required to perform the experiment are the setup of the equipment required for performing our measurements. Essentially, it will include the sonar, a bubble generator, processing unit as a laptop/computer.

3 Calculation

4 Results

5 Interpretation

6 Conclusion