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SLOSHING PROBLEM: SIMULATION AND EXPERIMENTAL VALIDATION

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ABSTRACT

This work presents the numerical and experimental analyses of a sloshing problem at low frequencies. The physical layout consists of a recipient placed over a shaking table able to produce controlled harmonic motion. The fluid dynamic response of the interface is reported for different: liquids (water and shampoo), depths and motion amplitudes and frequencies. Measurements of the free surface evolution are used to describe the oscillatory behaviour of the different analysed conditions.

A numerical model developed within the context of a finite element fixed mesh method [1] is used to simulate the physical situation. The computed interface positions are compared with the experimental data to validate such a model in the description of a sloshing problem.

Preliminary results for water are illustrated in Figure 1 showing the interface position at different fractions of a period together with an analytical solution (taken from [2]). The water depth is 20 cm and the characteristics of the motion are: maximum horizontal displacement 19 cm and frequency of 22 rpm.

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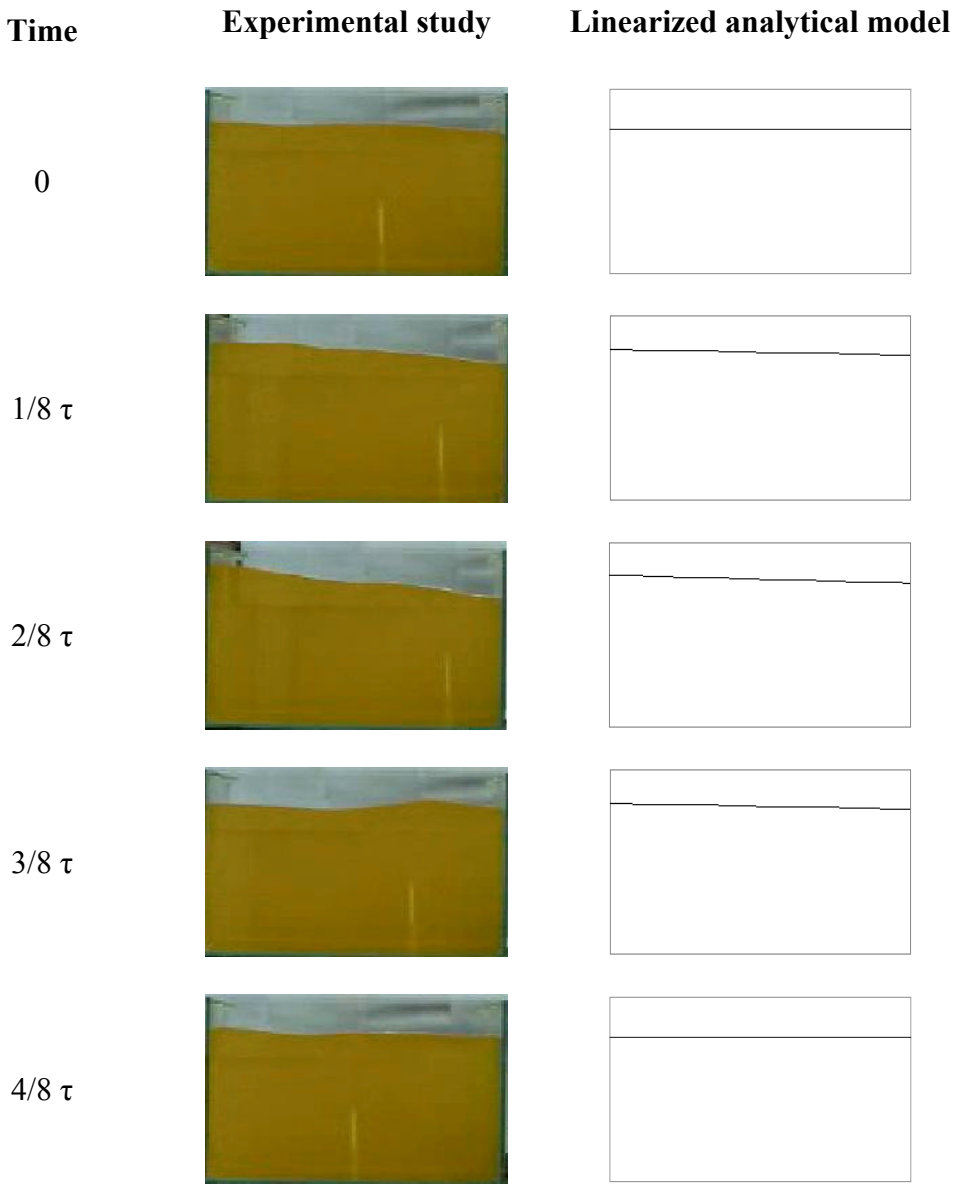

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