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Effects of time delay in a bubble chain system ANDREW OOI, The University of Melbourne, RICHARD MANASSEH, Commonwealth Scientific and Industrial Research Organisation, ALEXANDER DOINIKOV, Belarus State University, ANETA NIKOLOVSKA, The University of Melbourne — Experimental studies have shown that there is a preference for acoustic energy to propagate parallel to a vertical bubble chain. The coupled oscillator model has been used explain the qualitative behaviour of acoustic energy propagation but it has been shown in recent studies that the quantitative results from the coupled oscillator model do not agree with available experimental data. Adding time delays to the coupled oscillator model can produce results that are in better agreement with experimental data. In particular, it is found that the speed of propagation of acoustic energy along the bubble chain is much better predicted using the model with time delays. It is also shown that time delays have minimal effect on the eigenfrequencies and but has a dramatic effect on the damping coefficients of the eigenmodes for the vertical bubble chain system. Contrary to common belief, effects of time delays appear to be more important when the bubble are closer together than when they are further apart.

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