Amplitude Death Behaviour of Coupled Thermoacoustic Oscillators. NEVIN THOMAS, SIRSHENDU MONDAL, SAMADHAN A. PAWAR, R.I. SUJITH, Indian Inst of Tech-Madras — Amplitude death(AD) phenomenon can be utilized to develop a relatively simple technique which can be used to stop the unwanted high amplitude oscillations in thermoacoustic systems resulting from thermoacoustic instabilities. Here, we use a numerical model of the prototypical thermoacoustic system, Rijke tube, to systematically investigate the AD phenomenon in such systems. Bifurcation from the limit cycle oscillations which prevail in the uncoupled oscillators to AD is noted and the regions of AD are identified. We examine the effect of time-delay and dissipative couplings on the system of two Rijke tubes in cases where they are symmetrically and asymmetrically coupled. We could observe the cessation of oscillations in both the cases for appropriate combinations of coupling strengths, delay time and detuning. The relative ease of attaining AD when both the couplings are applied simultaneously is inferred from the results. The route from phase drift to synchronization to AD is seen when the dissipative coupling strength is incremented in steps. In the presence of strong enough coupling, AD was observed even when oscillators of dissimilar amplitude were coupled, while a significant reduction in amplitude was observed when coupling strength was not enough to attain AD.

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