We study the problem of stabilization for the acoustic system with a spatially distributed damping. Imposing various hypotheses on the structural properties of the damping term, we identify either exponential or polynomial decay of solutions with growing time. Exponential decay rate is shown by means of a time domain approach, reducing the problem to an observability inequality to be verified for solutions of the associated conservative problem. In addition, we show a polynomial stabilization result, where the proof uses a frequency domain method and combines a contradiction argument with the multiplier technique to carry out a special analysis for the resolvent.

This is a joint work with Eduard Feireisl and Serge Nicaise.