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Active modal control in rooms - practical approach

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Engineers dealing with noise reduction in habitations close to transportation traffic or industrial facilities encounter several problems to decrease noise level in rooms at low frequencies. Passive materials and current building construction knowledge enable to avoid noise transmission in habitations at medium and high frequencies and the regulations based on the dBA scale can often be respected. But these regulations do not take into account the real unpleasantness of noise for the inhabitants who are still disturbed by low frequency noise. Because of the modal behavior of rooms, air-borne and structure-borne noise generate high sound pressure level at the first modal frequencies, even with small amount of energy. The aim of this work is to decrease noise level in rooms at these specific and most annoying frequencies. Usual techniques of room acoustics and acoustic insulation reach their limits and cannot be improved due to cost and volume constraints. To reach our goal, active modal control seems to be the best way. The principle of the AMC is to decrease only the 2 or 3 first modal frequencies with a unique microphone-controller-loudspeaker system. Several results are presented for different excitations and room configurations. The controller setup has to be the more autonomous and flexible system as possible.