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Modeling of the acoustic eigenproblem with sound absorption
using boundary element method

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This paper deals with determination of resonant frequencies for absorbant 3D acoustic cavities. The behaviour of the sound absorbing boundary can be described with a Robin condition as proposed by Rajakumar et al. [Int. J. Numer. Methods Eng., 36, 3957-3072 (1993)]. This approach is inaccurate, especially for low frequencies because the absorption coefficient is assumed to be constant. We observed the acoustic admittance for foam and fibrous type materials varies linearly for low frequencies. The introduction of a new absorption coefficient allows to take into account this behavior in order to improve the accuracy in the determination of the first modes (typically less than 500 Hz in car interior). This formulation has been implemented in a boundary element program we have developed. The results are compared with those given by the finite element program ANSYS. Computations are carried out for rectangular parallelepiped and Sedan car interior.