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A transmission loss definition based on the root mean squared intensity

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Numerical simulation enables the calculation of the sound power transmitted through any structure for any arbitrary source but it can not be used to determine transmission loss, which is based on the transmitted power divided by the incident power. One can calculate the active power (= incident minus reflected power), but one generally can not determine the incident and reflected power themselves. In fact, apart from 1 dimensional analysis, transmission loss is only defined for diffuse sound fields and it only quantifies the acoustical performance of the structure for this field and not for the actual, in-situ, source. While the incident power can not be determined, the active and root mean squared power can. The latter quantity is introduced and is a measure for the total energy flow per period, i.e. the net energy flow and the energy flowing back and forth. A transmission loss definition based on the ratio between the active power and the root mean squared power is shown to closely resemble the transmission loss in the 1 dimensional case. Results for a 2 dimensional case show that the ratio is a quantity which does characterize the transmission of the structure as it is excited by the source.