Kurtosis of room impulse responses as a diffuseness measure for reverberation chambers - DTU Orbit (08/11/2017)

Kurtosis of room impulse responses as a diffuseness measure for reverberation chambers

This study presents a kurtosis analysis of room impulse responses as a potential room diffuseness measure. The early part of an impulse response contains a direct sound and strong reflections. As these reflections are sparse and strong, the sound field is unlikely to be diffuse. Such deterministic reflections are extreme events, which prevent the pressure samples from being distributed Gaussianly, leading to a high kurtosis. This indicates that the kurtosis can be used as a diffuseness measure. Two rooms are analyzed. A non-uniform surface absorption distribution tends to increase the kurtosis significantly in a small room. A full scale reverberation chamber is tested with different diffuser settings, which shows that the kurtosis calculated from broadband impulse responses from 125 Hz to 4 kHz has a good correlation with the Sabine absorption coefficient according to ISO 354 (International Organization for Standardization, Geneva, Switzerland, 2003).

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