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Effects of multiple directional sources on quantitative and qualitative analyses of concert hall acoustics

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The "orchestral impulse reponse" measurement technique using multiple directional sources and its effects on quantitative analysis of concert hall acoustics were discussed earlier [Kwon and Siebein, J. Acoust. Soc. Am. 120, 3263(A) (2006)]. An array with 16 directional loudspeakers approximating overall sound radiation patterns of each instrumental group of an orchestra was incorporated for room acoustical measurements and analyses. As a continuous study, this paper discusses qualitative assessments of concert hall acoustics over room subjective parameters including reverberance, clarity, warmth, spaciousness, envelopment, etc. The music signals binaurally recorded in a performance hall with the same source array were evaluated by means of subjective listening tests in comparison to those recorded with the single omni-directional source (dodec). The results showed that some perceived differences are present between the array with multiple directional sources and the one with a single omni-directional source. In the main orchestra seating, in particular, reverberance and clarity are perceived more but warmth is perceived less when compared to the recordings through the single omni-source. The results will be further discussed in conjunction with their quantitative measures resulted from the above measurement technique.