CFA '18 LE HAVRE ▪ 23-27 avril 2018
14ème Congrès Français d'Acoustique

Ability of a one-DOF lip model to predict some aspects of human trumpet performance

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In this study the ability of a simple lip model to reproduce the behavior of a human trumpet player is evaluated through comparisons between numerical simulations and measurements. A model of the {player-instrument} system is built from a simple one-degree-of-freedom lip model, non-linearly coupled to the instrument described by its acoustic input impedance. Multiple sound simulations are performed and compared to results obtained from playing measurements (in-vivo measurements) with respect to some acoustic descriptors. Analysis of two trumpet models show good agreement between simulations and measurements, with regards to the differences between instruments, supporting the relevance of this simple model to predict some attributes of a human performance. One long-term objective of this work is to support the design process of new instruments by providing some numerical tools that allow to predict the dynamic response of the {player- instrument} system from instrument design specifications.