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A framework for simulation of sibilant fricatives using implicit compressible flow solver HSUEHJUI LU, CHUNGGANG LI, Kobe University, AKIYOSHI IIDA, TSUKASA YOSHINAGA, Toyohashi University of Technology, KAZUNORI NOZAKI, Osaka University, MAKOTO TSUBOKURA, Kobe University — A numerical framework for modeling the sibilant fricative production is built in this study. The implicit time scheme with immersed boundary method based on a hierarchical structure grid as well as the modified solution-limited time stepping method for the compressible flow are adopted. Firstly, the acoustic resonance generated from the flow around the single plate is simulated to validate the numerical scheme and the result shows that this framework is highly efficient and suitable for the massive parallelization system to tremendously save the calculation time. Then, the simulation for a simplified model of the sibilant /s/ is conducted and SPL profiles are in good agreement with the experimental results. Finally, the simulation for a realistic geometry of sibilant /s/ scanned from the human vocal tract is performed to demonstrate that this framework is capable of making a contribution to the dental treatment in the near future.

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