MeshRIR

A Dataset of Room Impulse Responses on Meshed Grid Points
For Evaluating Sound Field Analysis and Synthesis Methods

https://sh01k.github.io/MeshRIR/

Shoichi Koyama, Tomoya Nishida, Keisuke Kimura, Takumi Abe, Natsuki Ueno, and Jesper Brunnström (The University of Tokyo)

- IR dataset at finely meshed grid points inside spatial region.
- Two subdatasets:
  - **S1-M3969**: From single source to 3D cuboid
  - **S32-M441**: From 32 sources to 2D square
- Suitable for evaluating sound field analysis/synthesis methods.
- Several example codes for sound field analysis/synhtesis are provided.

	S1-M3969	**S32-M441**
Sampling rate	48000 Hz	
IR length	32768 samples	
Room dimensions	7.0 m × 6.4 m × 2.7 m	
Number of source positions	1	32
Measurement region	3D cuboidal: 1.0 m × 1.0 m × 0.4 m	2D square: 1.0 m × 1.0 m
Intervals of microphone positions	0.05 m	
Number of microphone positions	21 × 21 × 9 (= 3969) points	21 × 21 (= 441) points
Reverberation time (T_{60})	0.38 s	0.19 s
Average temperature	26.3°C	17.1°C

Table: Detailed measurement conditions

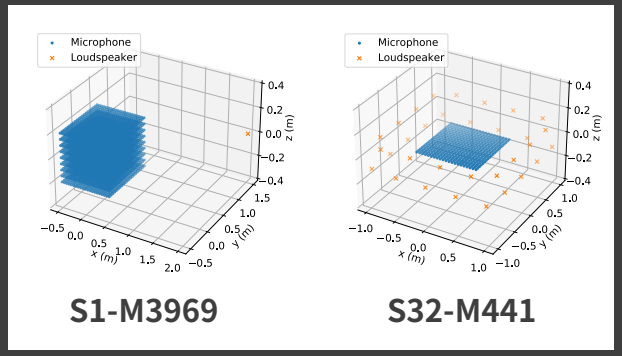

Fig: Configuration of sources and mics

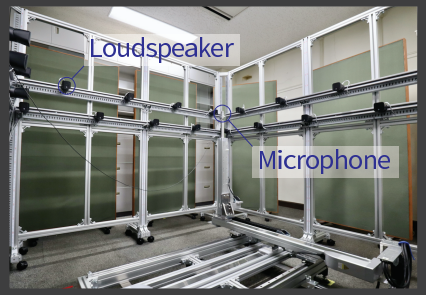

Fig: Measurement system

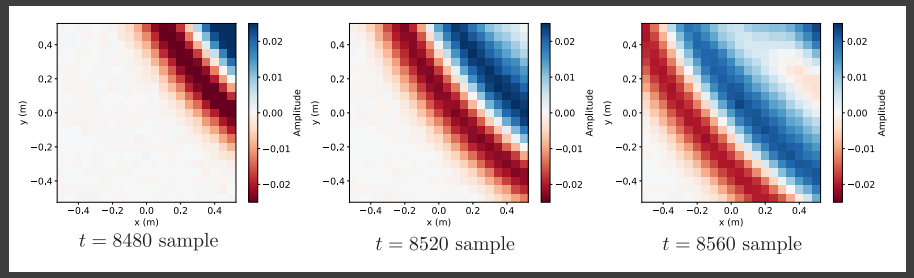

Fig: Pressure distribution visualised by **S1-M3969**

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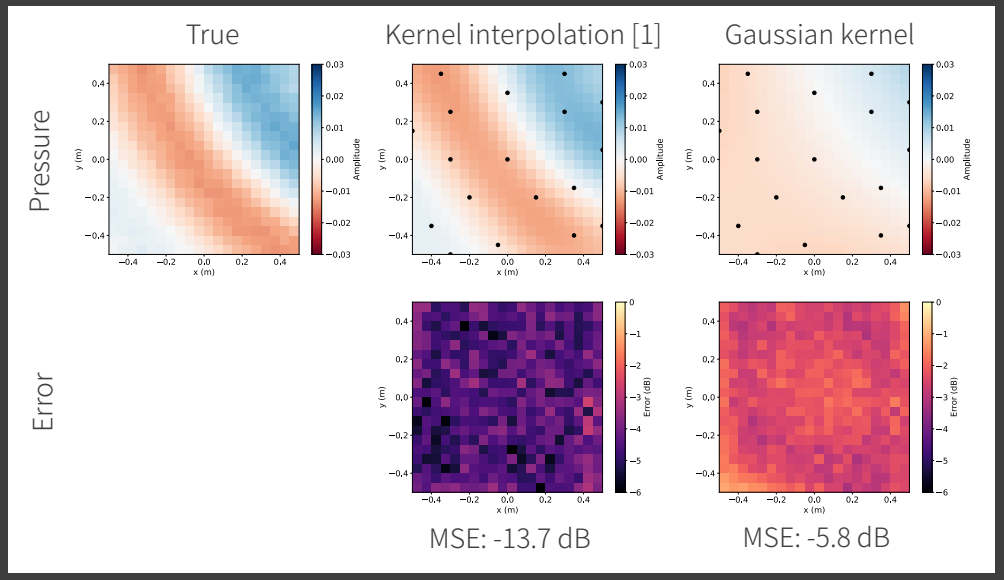
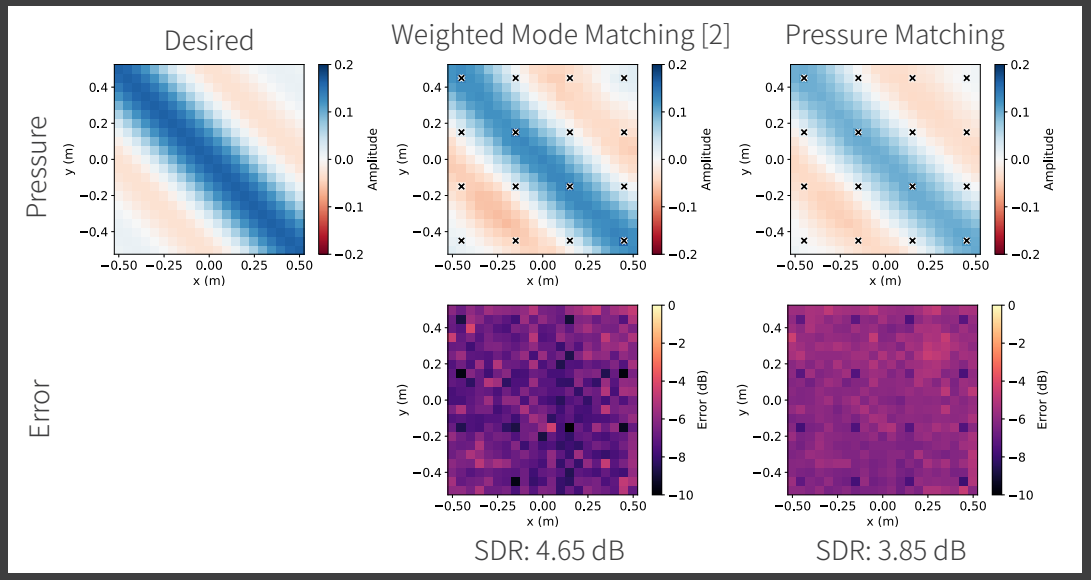
Sound field estimation using **S1-M3969**

- Pressure field is estimated from signals of 18 mics at black dots.
- Source signal is band-limited pulse.



Sound field control using **S32-M441 [3]**

- Plane wave field of band-limited pulse is synthesized by 32 sources.
- 16 control points are placed at positions indicated by crosses.



[1] N. Ueno, S. Koyama, and H. Saruwatari, “Sound FIeld Recording Using Distributed Microphones Based on Harmonic Analysis of Infinite Order,” IEEE Signal Process. Lett., 2018.
[2] N. Ueno, S. Koyama, and H. Saruwatari, “Three-Dimensional Sound Field Reproduction Based on Weighted Mode-Matching Method,” IEEE/ACM Trans. Audio, Speech, Language Process., 2019.
[3] S. Koyama, K. Kimura, and N. Ueno, “Sound Field Reproduction With Weighted Mode Matching and Infinite-Dimensional Harmonic Analysis: An Experimental Evaluation,” in Proc. Int. Conf. Immersive 3D Audio (I3DA), 2021.

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