LIB near-field HRTF database -- runMe.m

This script runs the processing and generates the database described in Marschall et al. (2023), "A database of near-field head-related transfer functions based on measurements with a laser spark source."

Link to article (OA): https://doi.org/10.1016/j.apacoust.2022.109173

If you are just interested in the processed database files, these are provided in the `database` folder.

The processing is split into three parts:

1. Loading the raw measurements, deconvolution of the laser-induced breakdown (LIB) response, and unprocessed database export;
2. Low-frequency extention (LFE) based on a spherical model, and LFE processed database export;
3. Generation of audio examples (not explicitly described in the paper).

The script uses the Spatially Oriented Format for Acoustics (SOFA) Matlab API, available at https://github.com/sofacoustics/API_MO. The scripts look for the API in `dep/SOFA`.

The code was developed and tested with Matlab R2021a on macOS.

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Change working directory

```
cd('src')
```

Processing raw measurements

This step requires the raw database files to be available in the `raw_data` folder. These are provided as a .zip file due to the large size and need to be unzipped first. The size of the uncompressed raw data is about 13 GB.

The script `proc_MeasToSOFA.m` is called to load and process the measurements. After the process completes, the user is asked to store the output in a single SOFA file (by default, in `database/NF_LIB_HRTF_measured.sofa`).

Figure 3 in the paper (LIB pulse and inverse) is plotted.

```
proc_MeasToSOFA;
```

Applying the low-frequency extension (LFE)

The script `proc_LFE.m` is called to load the database and run the LFE. The user is asked to load an input SOFA file, and after the processing is complete, is asked to store the output in a single SOFA file (by default, in `database/NF_LIB_HRTF_LFE.sofa`).

Figures 5-10 in the paper are plotted.

```
proc_LFE;
```

Generate per radius SOFA files

The script `proc_separate_radii.m` generates one SOFA file for each radius when an input SOFA file with multiple radii is provided. By default, the scripts loads the output of the LFE script `NF_LIB_HRTF_LFE.sofa`.

```
proc_separate_radii;
```

Generating sound examples

The script `proc_Audio.m` is called to generate an audio example. The user is asked to select a SOFA file to use, and then to save the output sound file.

```
proc_Audio;
```