New Features of CadnaR release 2019

The list of new features offered by **CadnaR** release 2019 (incl. MR1 and MR2) is subdivided into the following sections:

- Calculation/Configuration

- **CadnaR**-Objects

- Further New Features

- Miscellaneous

- Import/Export

- **CadnaR**-Options

Please note that some of the new features require the appropriate **CadnaR** option.

Calculation/Configuration

- calculation procedures "Particles" and "Image Sources -> Particles": automatic runtime estimation limited to a maximum of 10 s based on the mean free path (editable). The estimated values (mean free path MFW, average squared segment length MQFW and gamma squared) are written into local text blocks.
- **Extras** menu (for AUDIO option): new commands **Calculate STI-Matrix** and **Evaluate STI-Matrix** (with selection of variants in case of multiple variants). Note: The STI matrix is used to determine speech intelligibility between all pairings of speakers-listeners in a room.
- STI matrix evaluation: Besides a normalized noise level spectrum ranging from 25 to 55 dB(A), a user-defined noise level spectrum can also be used.
- status line: Sigma display during calculation now shows iteration number, particle number and sigma values of the last calculated iteration.
- Recalculation of STI at receivers (**Extras** menu, requires option AUDIO): changing the noise level spectrum does not require a recalculation of the echograms, but just of the STI values (increasing calculation speed).
- An individual noise level spectrum per variant can be specified for receivers (access via the user-defined **Receiver** table with additional columns for new attributes, new option „prefer noise level from receiver" on "RIR-Evaluation" tab)

CadnaR-Objects

- all objects: new ID length 47 characters
- all objects: selecting an object or a group: status line displays object type, name, ID or group pattern.
- all object tables: table row of the object selected in 2D plan view gets highlighted.

- Receiver Chain: optional calculation of the sound decay curve (SDC) according to VDI guideline 3760 (for calculation procedures „Particles", „Image Sources -> Particles" or „Image Sources") with path geometry according to VDI 3760, evaluation of parameters DLf, DL2 and DL2 (BIA) for ranges near|middle|far according to VDI 3760.
- **Box-type Source** dialog: now displays object's volume, surface, and emitting area.
- **Box-type Obstacle** dialog: now displays object's volume and surface.
- objects "Box-type Source" and "Box-type Obstacle": new attributes (dimensions XDIM, YDIM, ZDIM, total surface SURFACE, volume VOLUME, Note: LENAREA for box-type sources is - as before - the sum of the emitting areas).
- PolyMesh Context Menu: new command **Break PolyMesh into Pieces** decomposes a single PolyMesh with n triangles into n PolyMeshes with one triangle each based on the actual triangulation.
- direct graphical input of rotated box-type objects (box-type obstacle, box-type source): Input using 3 points, using2 points generates an axis-parallel object.
- object „Symbol": additional symbol types „Caption: Grid" and „Caption: Objects" selectable
- object appearance (**Options** menu): color selection with access to local/global library of color palettes

Further New Features

- new graphical user-interface:
    - scalable object icons (on toolbox and on toolbar)
    - scalable font in dialogs (**Options|Miscellaneous** menu)
- dialog **Grid Arithmetics**: now with access to cni-files and addressing grids in variants
- new Library Object: Color Palette (used for **Grid Appearance**)
- new dialog **Grid Appearance**: selection of color palettes for each evaluation parameter group (Default (i.e. level), Reverb Times, STI/STIPA/CIS/D50, ALcons)
- values at grid points now with 0 up to 2 decimals depending on the evaluation parameter (e.g. displaying STI on the grid)
- new Library Object: Product Library (local+global), storing absorption coefficients of products
- dialog **Absorption Spectrum** (local+global) extended for optional use of referenced products and corresponding conversion into effective absorption spectrum
- **Extras** menu (for AUDIO option): Generate and replay sound files via the new **Auralization** dialog renderin audible the acoustical situation in a room based on the room fittings of the selected variant.
- **Extras** menu, **Delete Echograms**: deletes no longer required echograms in receiver chains of the active variant (with SHIFT key for all variants)
- **Extras** menu, **Fill missing 8 kHz value of absorption coefficients**: sets a missing 8 kHz value in local absorption spectra equal to the 4000 Hz band.
- **Options** menu: new **Auto-Save** dialog (options: no backup, remind or in time intervals)
- menu **Tables|ObjectTree**: new command **Purge ObjectTree** deletes empty folders in the ObjectTree (after safety prompt).
- Consistency Check: new check for ObjectTree groups (including checking for sorting, search for double groups and for just a single Root directory)
- menu **Tables|Group**: Group table now has indented ObjectTree group names according to the hierarchy level.

Miscellaneous

- 3D-View: grid points are now also displayed with oversampling > 1 (as on 2D grid already).
- menu **Extras|System-Info (CPU)**: For PC systems with at least 2 NUMA nodes (non-uniform memory access), the node assignment to each logical processor is shown in addition.
- object dialogs for Barrier, PolyMesh, Box-type Obstacle and Box-type Source enlarged and optimized.
- Particle-Pingpong with the hybrid modell: inactive particles (resulting from the image source model) now displayed as small grey points (3D-View, menu command **Appearance|show inactive particles**)
- extended keyword #(Table, …): export/output of tables for spatially averaged reverberation times (for active variant: RGTnachIP, RGTnachIPK, for all variants: RGTnachVarIP, RGTnachVarIPK)
- input of two user-defined reference reverberation time spectra possible (displayed in the **Reverberation Time** diagrams)
- user-defined value range for reverberation times in diagrams
- number of decimals X in partial level tables controllable via INI file (section [Main], dBOutPrec=X)

Import/Export

- menu **File|Database**: import from MS Excel folders (as an alternative to ODBC).
- menu **File|Database**: import via ODBC and from MS Excel folders also for product library.
- menu **File|Import**: ASCII import for main axis parallel Box-type Obstacles possible (defined by using two points pmin and pmax)
- CLF import of loudspeaker directivities (file formats *. CF1 and *.CF2)
- ASCII import for Product Library (**File|Import** menu, „ASCII-Products")
- Export of results and object data to Word-DOCX and Excel-XLSX (requires option ORG or OFFICE)

CadnaR-Options

- option AUDIO: new commands **Calculate STI matrix** and **Evaluate STI matrix** (with selection of variants in case of multiple variants). Note: The STI matrix is used to determine speech intelligibility between all pairings of speakers-listeners in a room.
- option AUDIO: Generate and replay sound files via the new **Auralization** dialog (**Extras** menu) rendering audible the acoustical situation in a room based on the room fittings of the selected variant.
- option AUDIO: Recalculation of STI at receivers (**Extras** menu, requires option AUDIO): changing the noise level spectrum does not require a recalculation of the echograms, but just of the STI values (increasing calculation speed).
- options ORG or OFFICE: Export of results and object data to Word-DOCX and Excel-XLSX