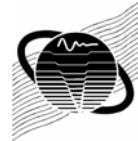


VAC TOOLBOX

'A Vibro-Acoustic Swiss Army Knife'

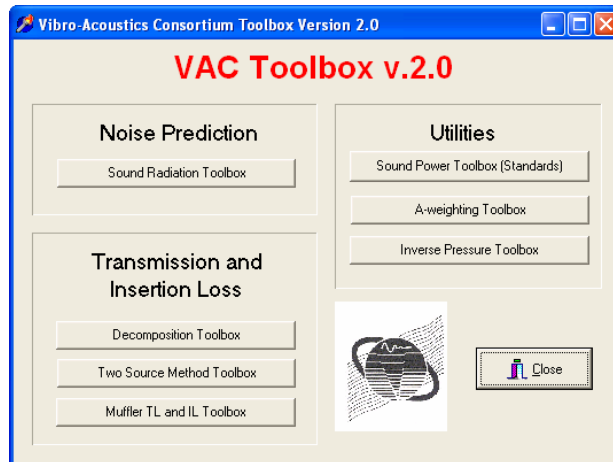
Ferdy Martinus
Zeguang Tao
University of Kentucky

Vibro-Acoustics Consortium

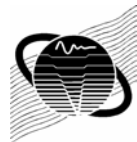


Modules

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

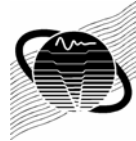
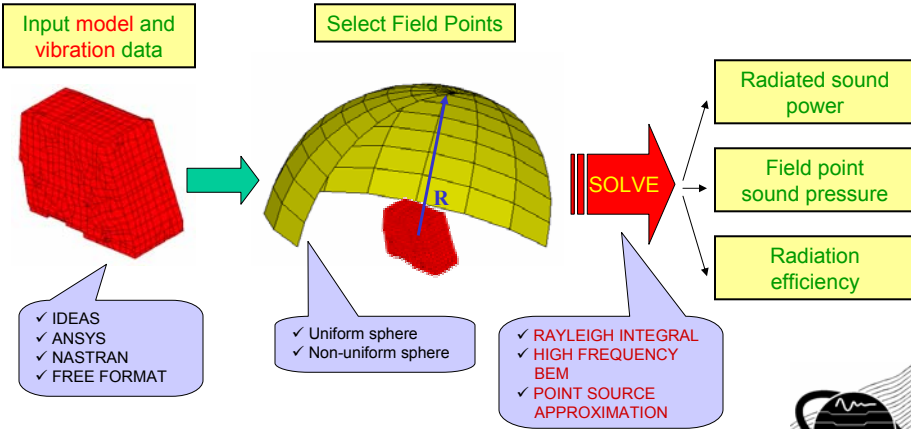


Vibro-Acoustics Consortium



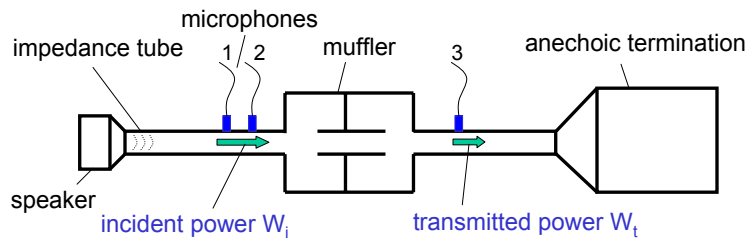
Sound Radiation Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

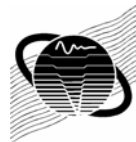


Decomposition Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

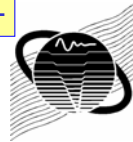
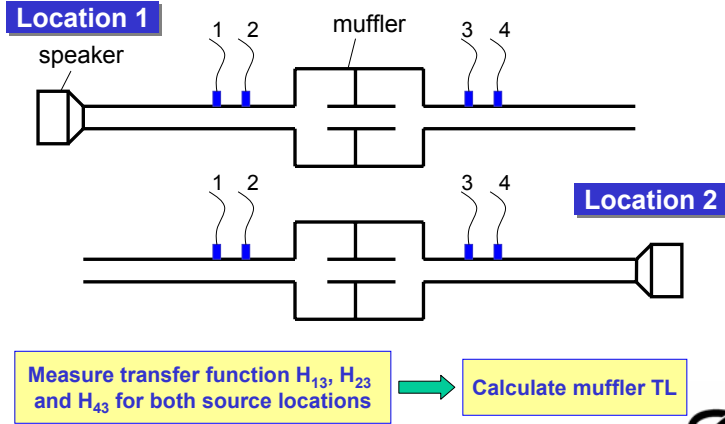


$$TL = 10 \log_{10} \left(\frac{W_i}{W_t} \right) \text{ (dB)}$$



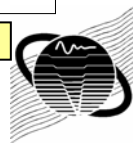
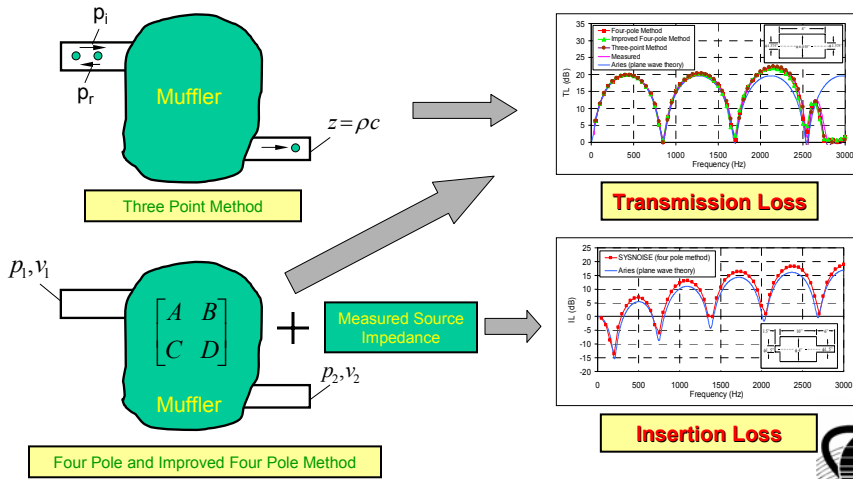
Two Source Method Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife



Muffler Analysis Toolbox

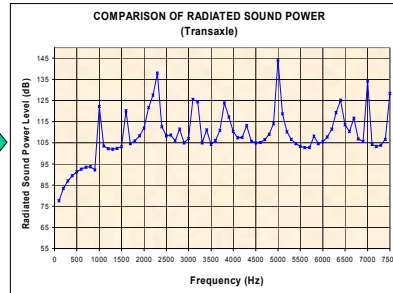
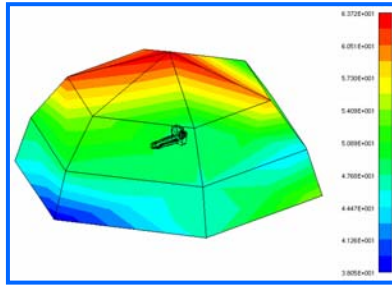
Vactoolbox - A Vibro-Acoustic Swiss Army Knife



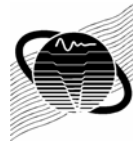
Sound Power Toolbox (Standards)

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

SYSNOISE field point pressure data

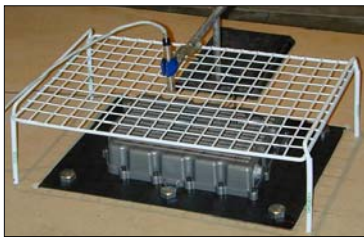


APPLICABLE STANDARDS



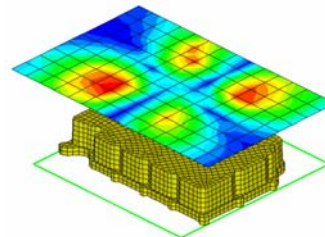
INA Interface

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

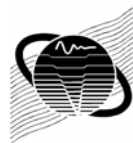


150 pressure measurement data files

Translator



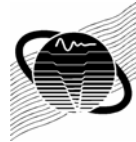
SYSNOISE field point pressure data



FUTURE WORK

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

- Add new modules:
 - source impedance calculation
 - octave/one-third octave bands conversion
 - suggestions?

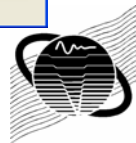


Appendix 1: Sound Radiation Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

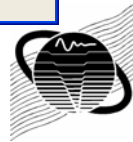
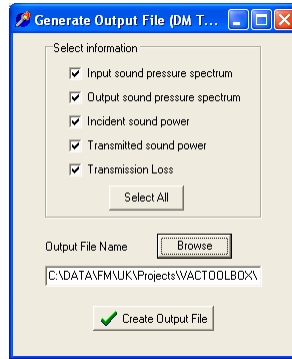
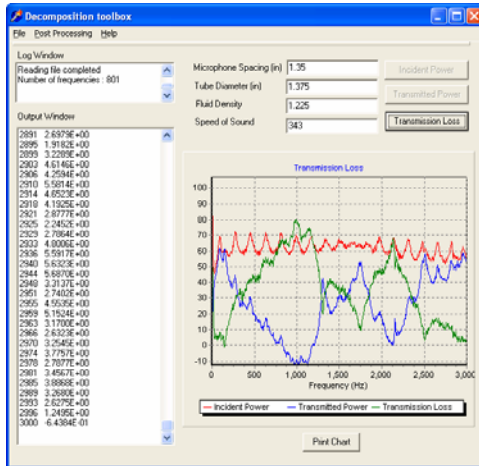
The screenshot displays the Rayleigh Integrator v2.0 software interface. It includes several configuration windows:

- Parameters:** Shows frequency range settings (From: 200, To: 2000, Step: 200).
- Sphere Configuration:** Allows selection of sphere type (Non-uniform or Uniform) and defines sphere center coordinates (X, Y, Z in inches) and radius (5 inches).
- Fluid Properties:** Defines fluid characteristics such as Name, Speed of sound (343 in/s), and Density (1.2 kg/m³).
- Generate Output File:** A list of checkboxes to select data to be saved in an output file, including sphere parameters, nodal coordinates, element connectivity, pressure at various points, radiation efficiency, and radiated sound power.
- Main Window:** Displays a graph of Radiated Sound Power (dB) versus Frequency (Hz) from 500 to 2000 Hz. The graph shows multiple data series, including Rayleigh and PSA.



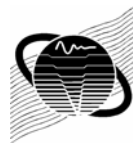
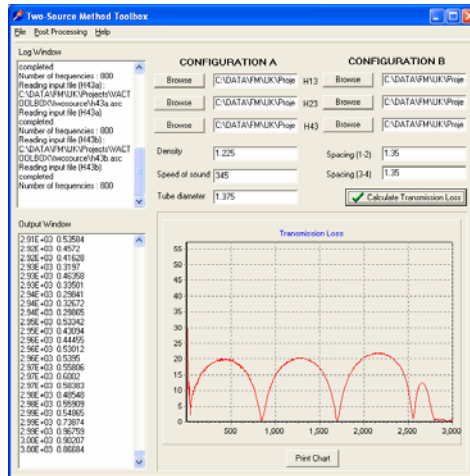
Appendix 2: Decomposition Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife



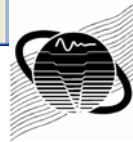
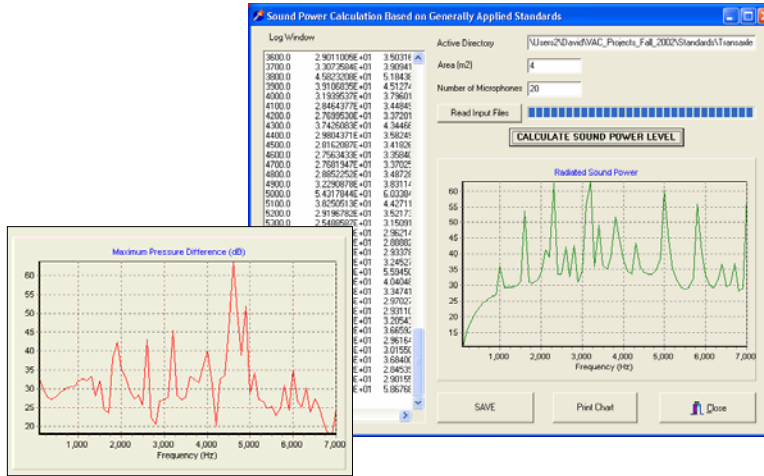
Appendix 3: Two Source Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife



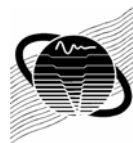
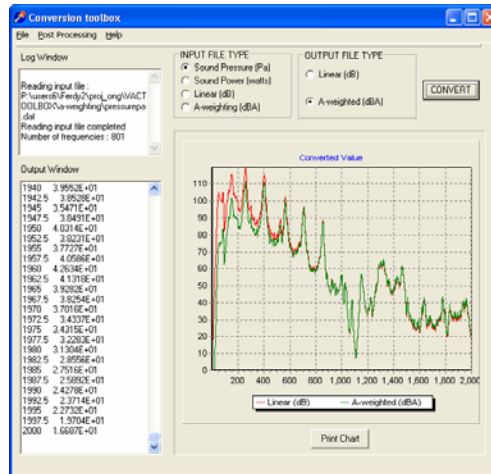
Appendix 4: Sound Power (standards) Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife



Appendix 5: A-weighting Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife



Appendix 6: Inverse Pressure Toolbox

Vactoolbox - A Vibro-Acoustic Swiss Army Knife

