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APP GRATUITA
NoiseCalc

For consultants in environmental and building acoustics,
for HVAC professionals,
for music and audio professionals,
for those studying or interested in applied acoustics

NoiseCalc

SUMMARY

- Project presentation
- Brief introduction to the 12 functions
- Glossary of some terms
- Credits

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NoiseCalc

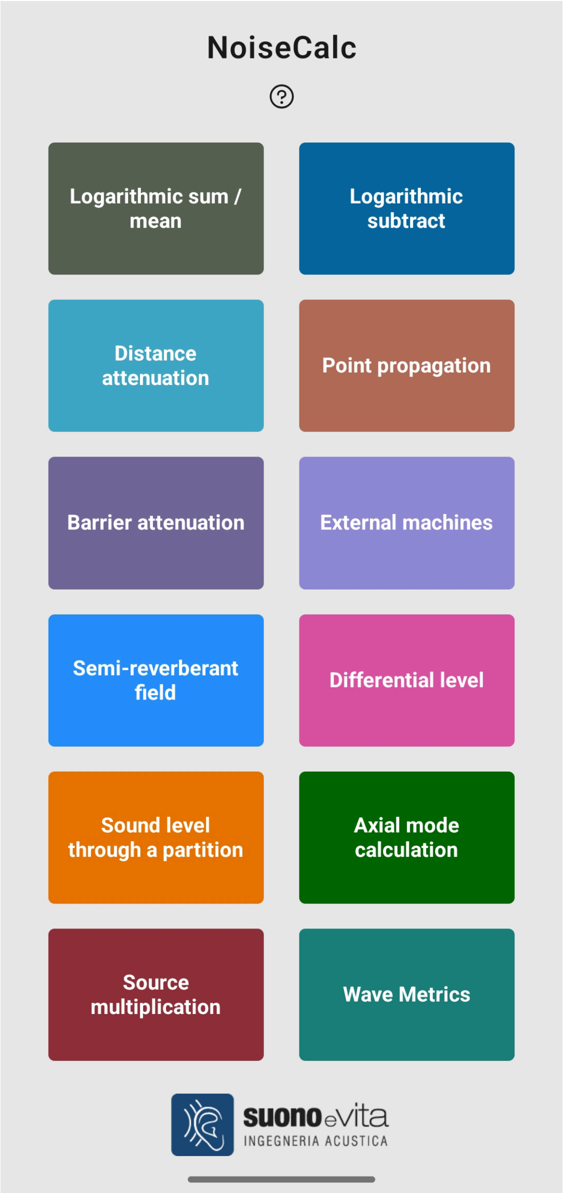
Developed by the acoustic engineering studio **Suonoevita**, Lecco Italy.
Started in 2020 during the COVID period.
Its fifth release is released in February 2026 with some new features.

Free calculator for acousticians and anyone involved with sound and noise control.

Used in the Applied Acoustics course at the University of Bergamo and can be useful to all students of Physics, Acoustics and Technical Physics in general.

Works on smartphones with iOS and Android systems.

Currently both have the release **2.6.0**



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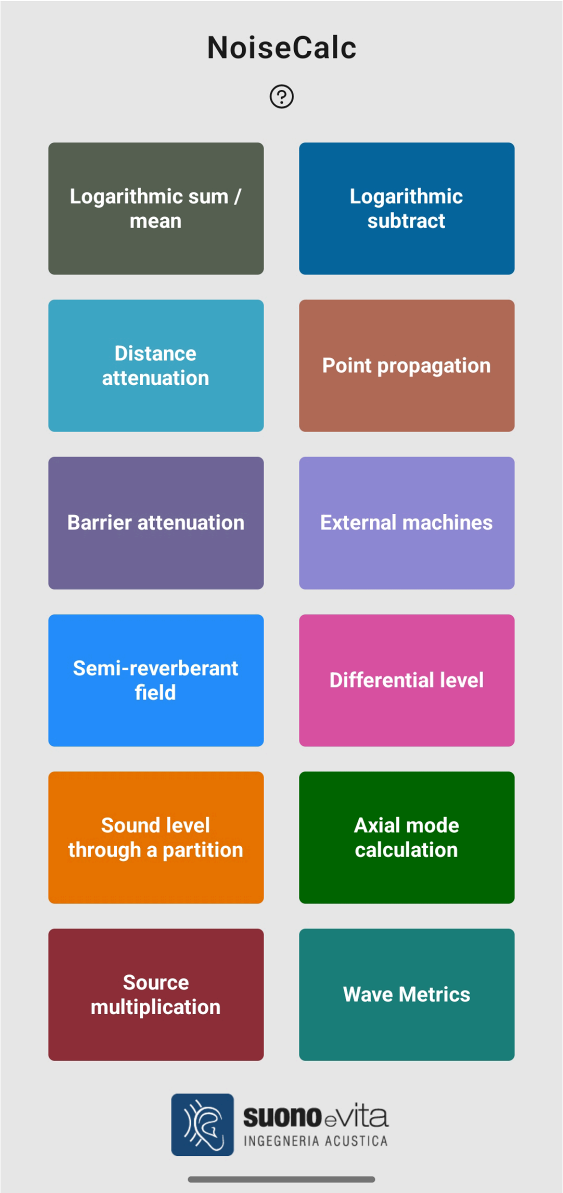
NoiseCalc

The app applies the basic formulas of applied acoustics.

It is designed for immediate use in the field and for the development of simple technical reports.

Let's introduce the 12 modules and discuss when they can be applied and what precautions to take when using them.



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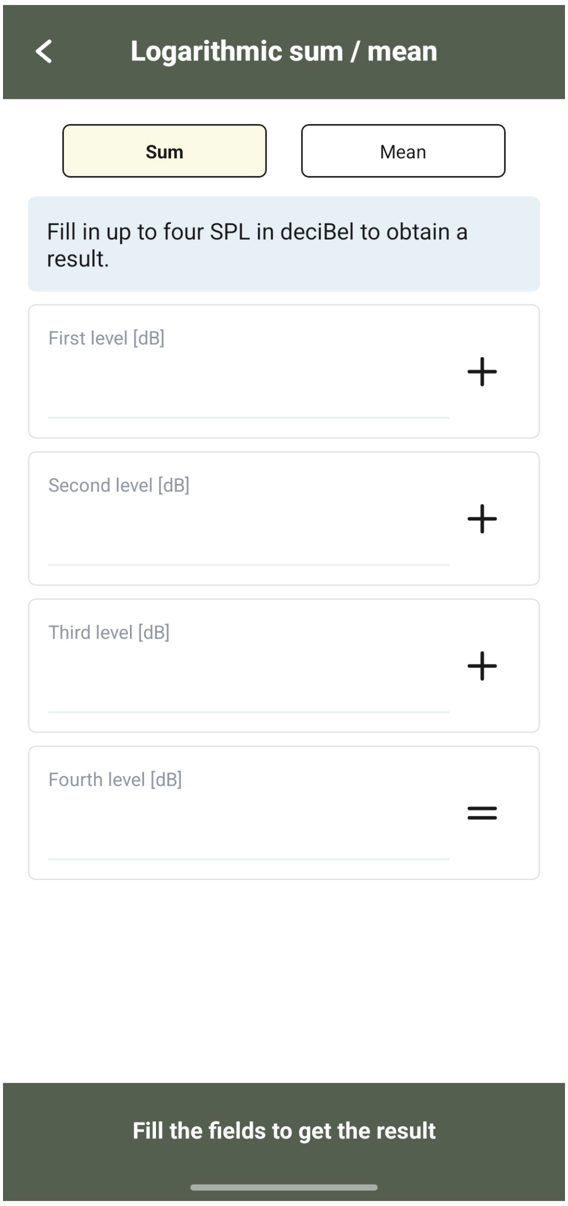
1. LOGARITHMIC SUM/AVERAGE

Since it's based on logarithms, the mathematics of decibels is very different from that of everyday life.

This tab is useful for adding together acoustic powers or sound pressures, or for averaging them.



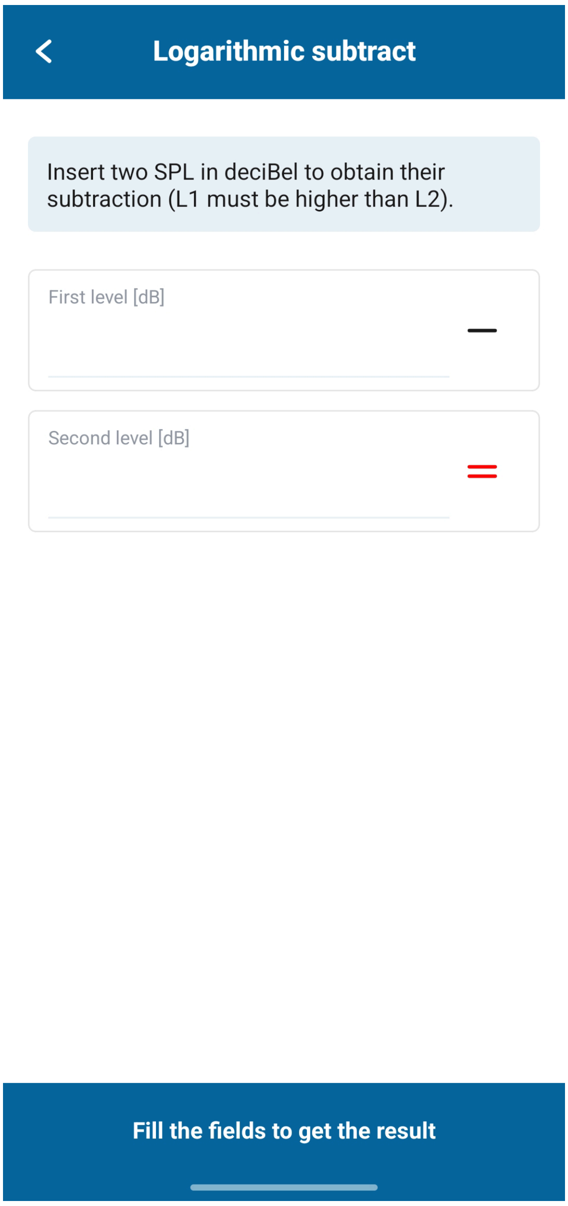
This module can be used, for example, if there are many machines close to each other, when we have measured or calculated the energy values of multiple sources at a single point and we want to add them together (and to the residual level of that point).

2. LOGARITHMIC SUBTRACTION

The mathematics of decibels is very different from that of everyday life.
This tab is also useful for **defining the energy of a sound source.**

It can be used, for example, when we carry out sequential Lp measurements with the machine on and off in the same SPL measurement point: by making the log subtraction, we can obtain the pure energy sound pressure level emitted by that source at that measurement point.

We can use this calculated value in the other modules of the app.



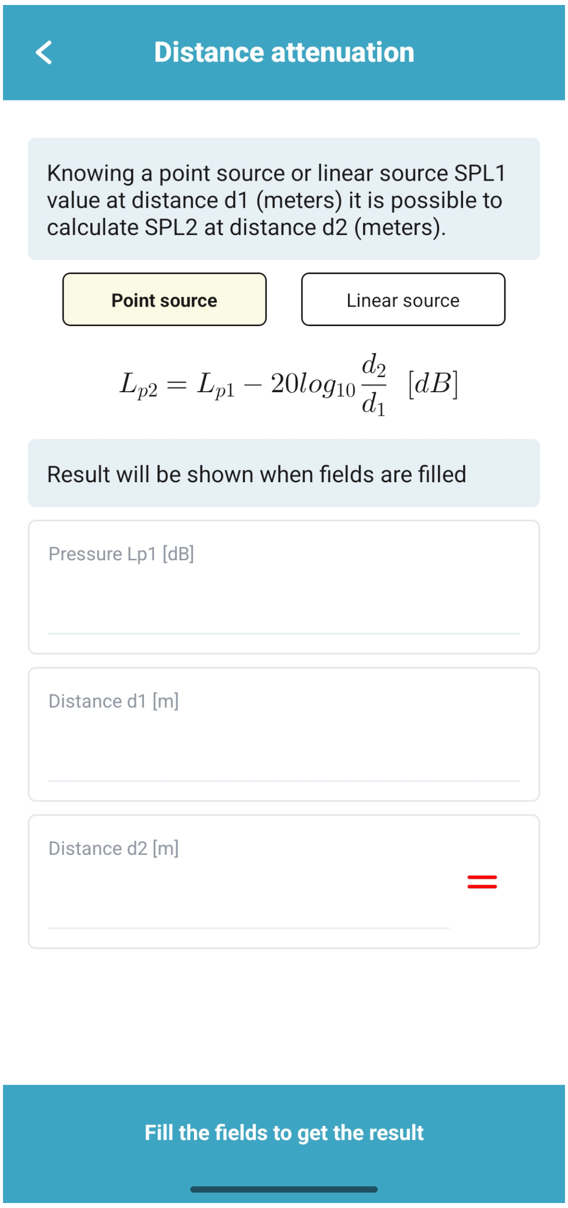
3. ATTENUATION BY DISTANCE

By measuring the sound level given by a source at a point P1 and the distance from the source, we can estimate what level we will have in P2 at another distance.

Added calculation for linear sources (e.g. roads).

Remember, however, that if the source is large, it cannot be immediately considered point-like and that this formula is valid in free field (be careful of reflections!).

Remember that the residual level at that P2 point should always be added to the calculated energy.

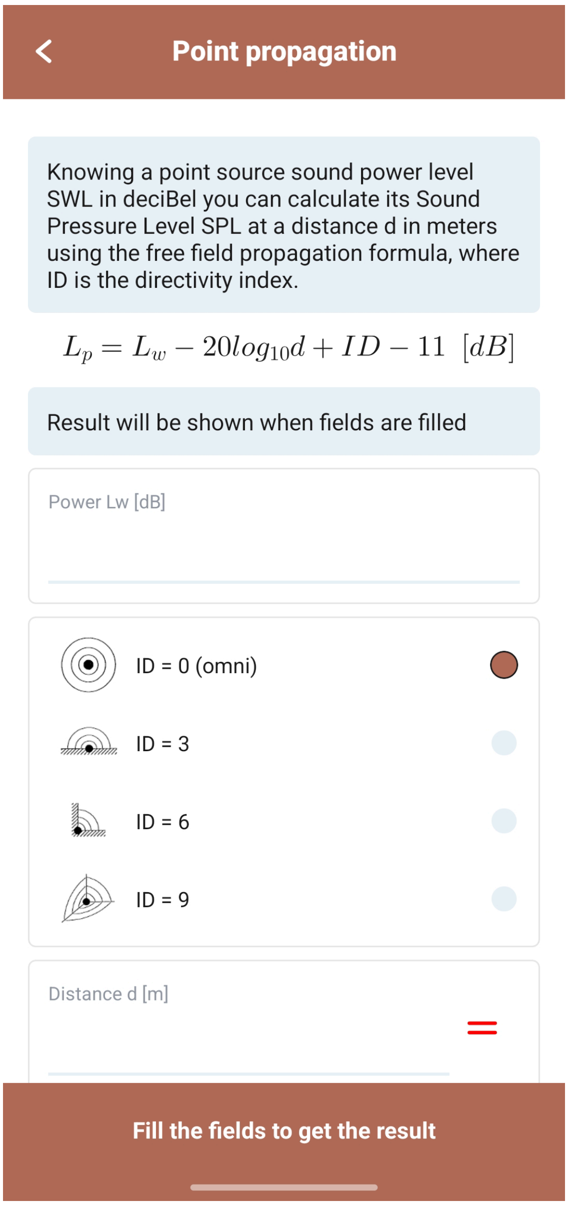


4. POINT PROPAGATION

When we know from the technical data sheet the declared power level Lw of a sound source, we can estimate what pressure level Lp we will have at a distance of d.
We have to indicate how many surfaces there are near and around the source.

Remember, however, that if the source is large, it cannot be considered point-like and that this formula is valid in a free field.

Remember that the residual level at that distant point should always be added to the calculated energy.



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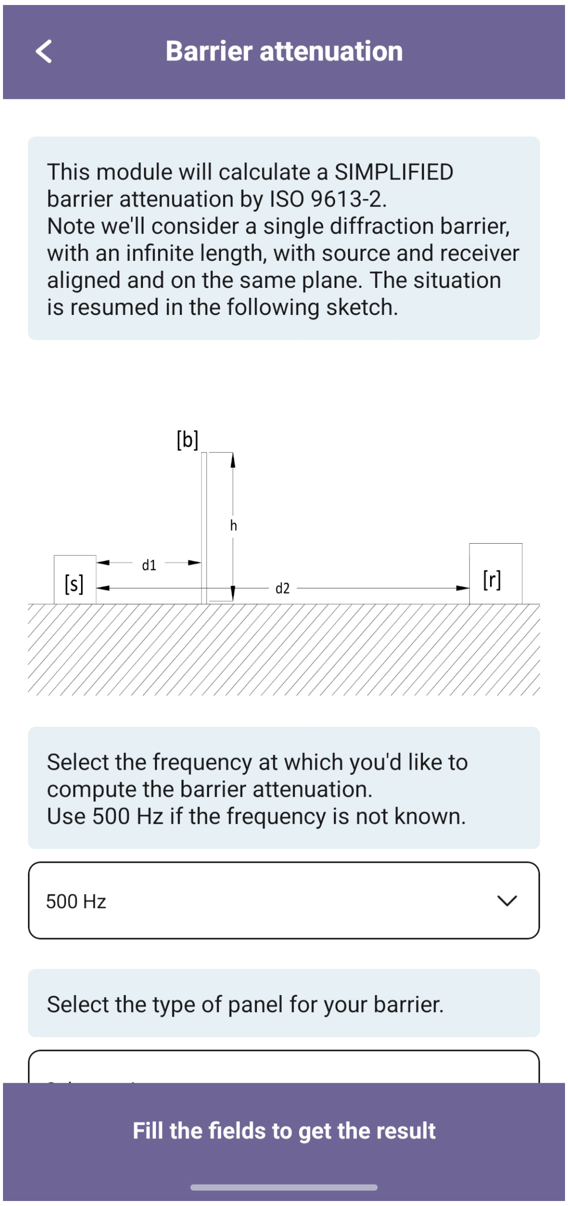
5. BARRIER ATTENUATION

Useful for making a first estimate of how much I can reduce with a sound barrier.

NEW: Starting from the SPL measured at 1 [m] from the source, this module returns the user an estimated Lp at the receiver, considering both the direct path (through the barrier) and diffracted path (above the barrier).

It is used for simple assessments of outdoor mitigation.

Please note that here the calculation is performed for each individual third octave frequency band. The first choice in the table will give a single number estimate, which uses the Rw value of the panel and the diffraction calculated at 500 Hz.



5. BARRIER ATTENUATION

Once all the necessary data has been entered, the user will be provided with:

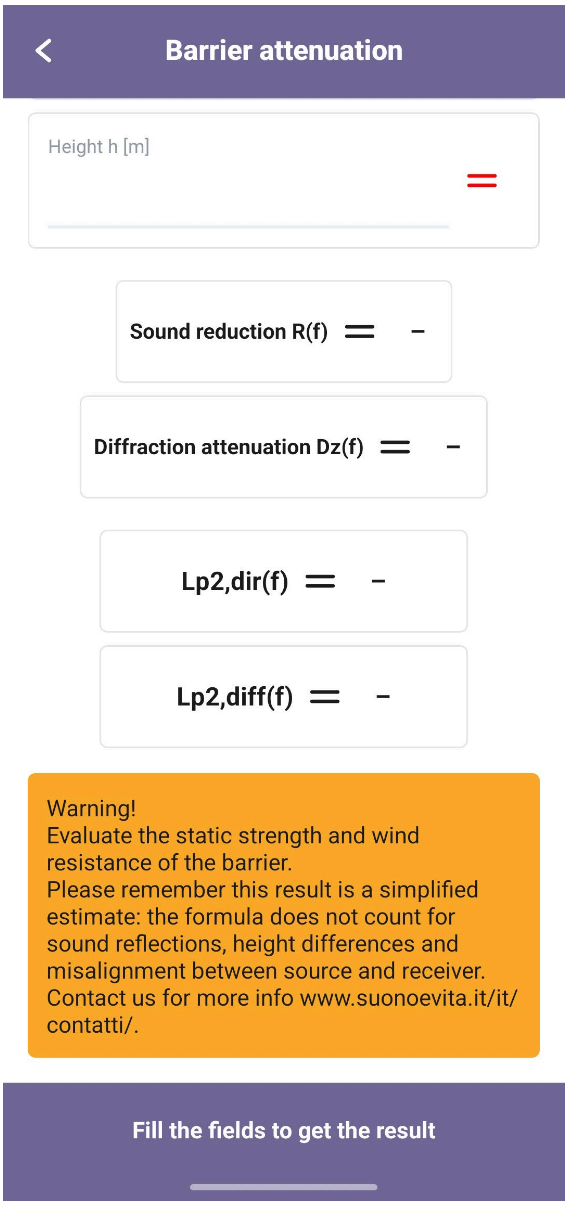
The sound reduction of the selected panel (Rw or R(f) if working in a specific frequency band)

The diffraction attenuation of the barrier (Dz or Dz(f))

The pressure value Lp2 according to the direct path, calculated as: Lp2,dir = Lp1 – 20log(d1+d2) – R(f)

The pressure value Lp2 according to the diffracted path, calculated as: Lp2,diff = Lp1 – Dz(f)

Lp2tot as the logarithmic sum of Lp2,dir and Lp2,diff



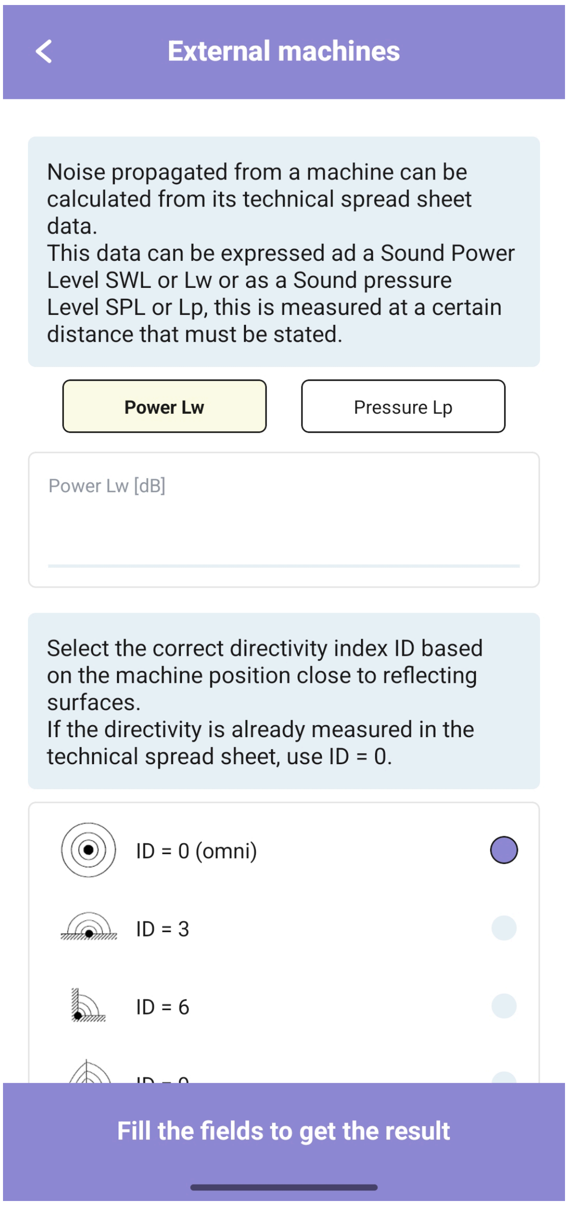
6. NOISE FROM EXTERNAL MACHINES

Designed for those who are not used to acoustic calculations.

Knowing from a technical data sheet the declared sound power level Lw of the source or the pressure data Lp measured at a certain distance (d0) we can estimate what sound level we will have at a distance d from the source.
We have to indicate how many surfaces there are around the source.

The app will already give me an initial automatic response if the sound source will have administrative problems by the Italian law.

<u>If in doubt, contact a Competent Acoustic Consultant.</u>



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7. SEMI-REVERBERANT FIELD

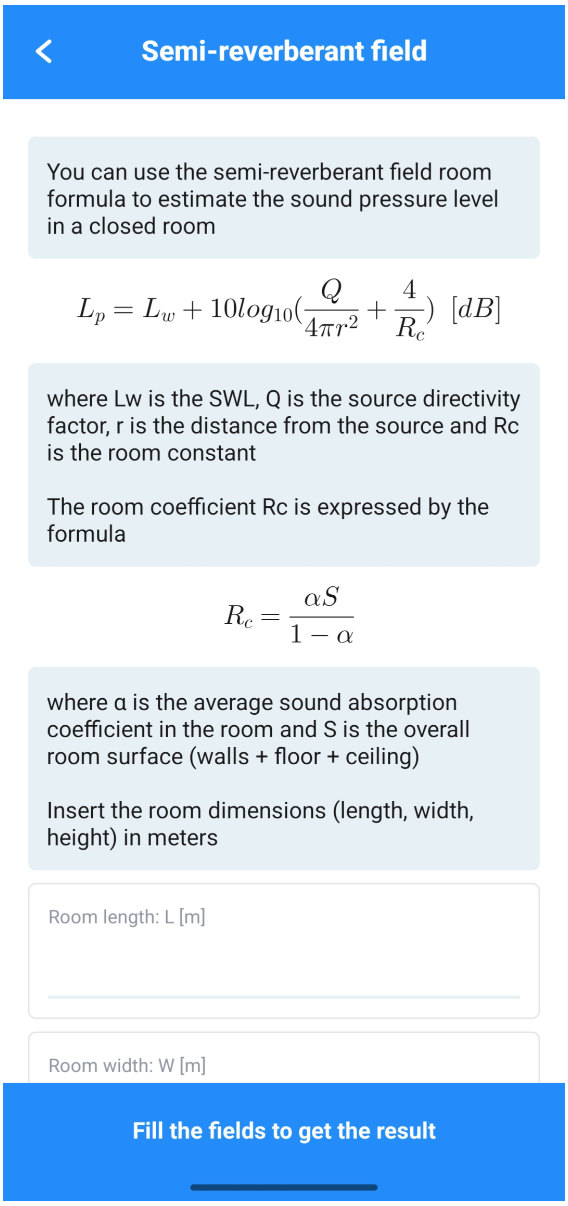
Useful for estimating the influence of acoustic correction on the average sound pressure level within a room.

If there is little sound absorption, the result is that we amplify the overall sound level within that environment.

A transition frequency is also estimated, below which the effect of the resonance room modes will have to be considered.

NEW: The module calculates the critical distance of the room, at which the sound pressure level of the direct and reverberant sound fields are equal.

It is used for example in simpler acoustic impact studies with emissions at closed windows (i.e. restaurants).



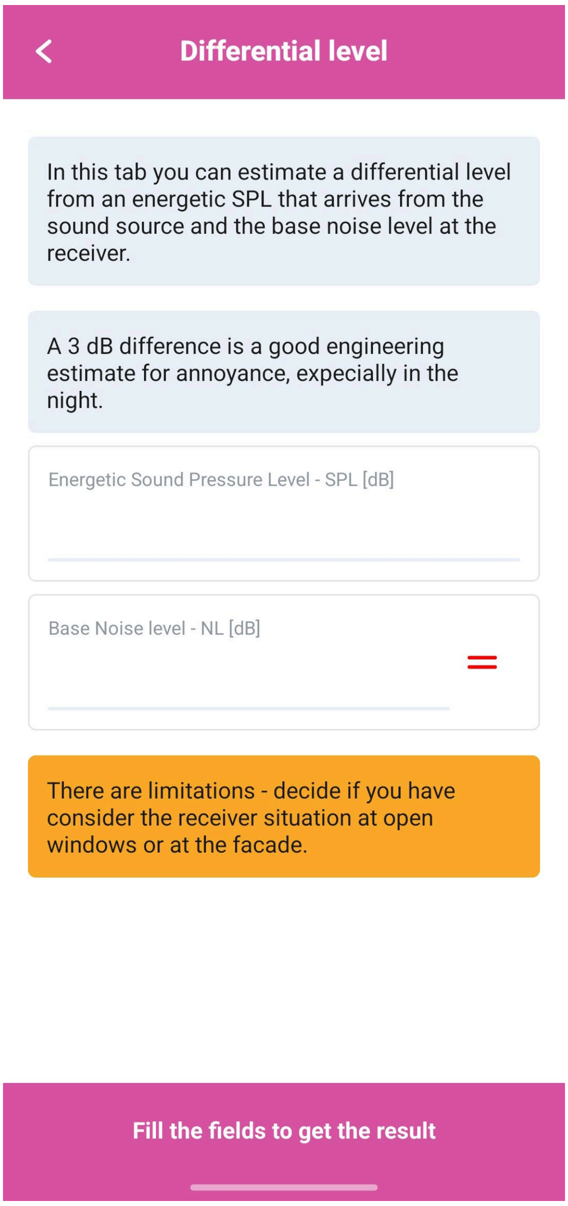
8. DIFFERENTIAL LEVEL

We can carry over the calculated energy level from one of the previous screens or enter it here.

We insert the residual level (the level that exists at the spatial point without the active source).

The app will already give me an initial automatic response if I am inserting a machine/source that may have administrative problems with the administrative Italia law

<u>If in doubt, contact a Competent Acoustic Consultant</u>.



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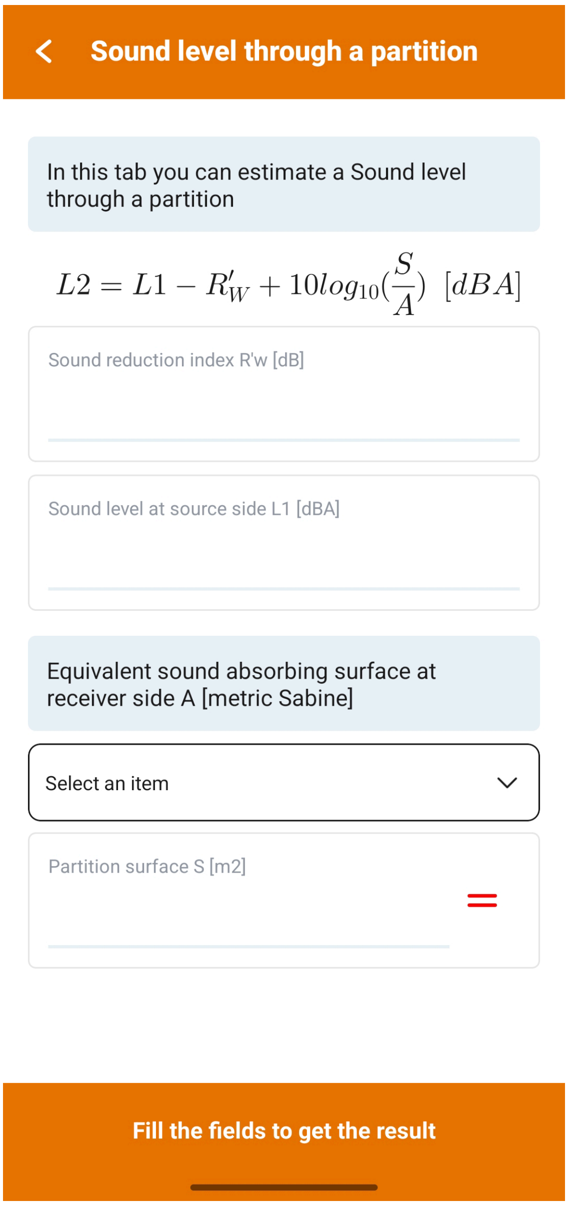
9. LEVEL THROUGH A PARTITION

Useful for making an initial estimate of how much noise can pass through a wall or a ceiling, given the average sound level LAeq in the disturbing room and the sound insulating power R'w of the partition itself.

That value is an energetic estimation, and it must be added to the residual level (L1) that exists in the receiving room.

Remember that R'w parameter is a very weak value for studying complex frequency situations.

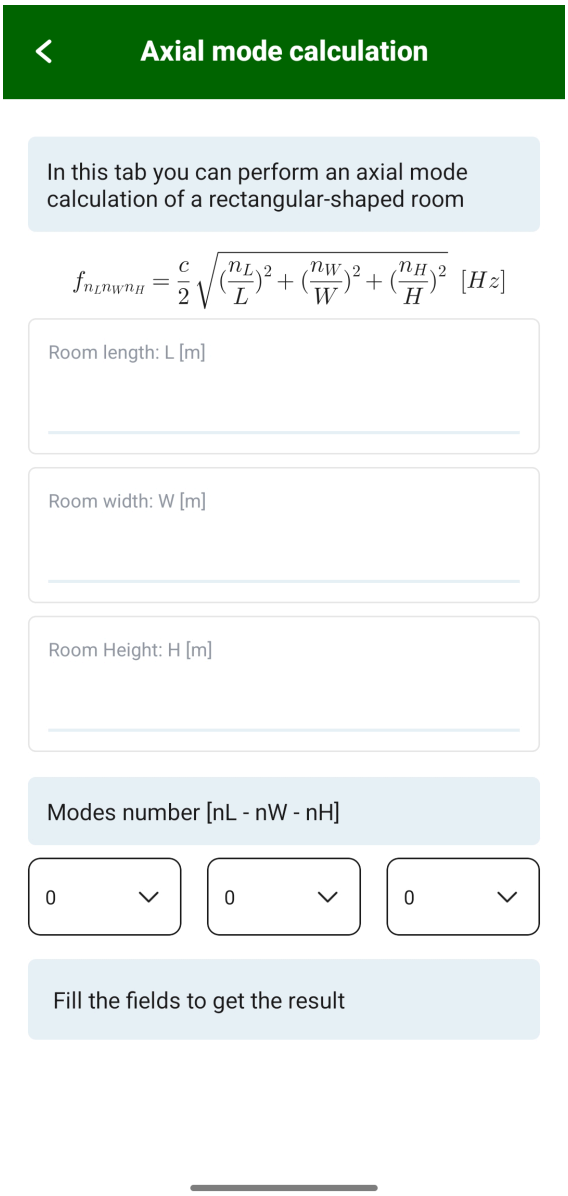


10. RESONANCE MODES

Useful for understanding room behaviour below 250 Hz: useful on the tonal components of noise and the fundamentals of music in everyday ‘small’ rooms.

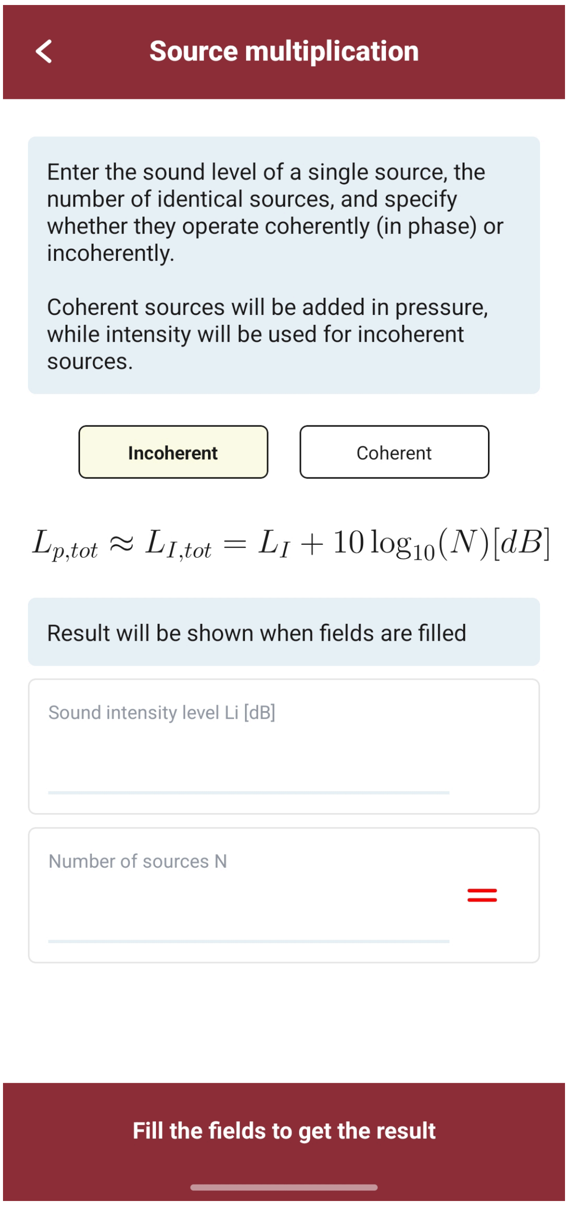
A probable transition frequency is also estimated, below which Sabine's model loses value and the resonances becomes ‘dangerous’.

It is used for example when you are taking a measurement with the windows closed and a pure tone is present, or when a machine has a very strong fundamental frequency in its sound emission, it is used a lot to optimize listening rooms.



11. SOURCE MULTIPLICATION

NEW: The source multiplication module allows the user to estimate the overall sound pressure level emitted by N identical sources, all having the same acoustic power level.



When the sources have the same phase, and are therefore **coherent**, the pressure level can be used to compute the overall LpTot.

This doesn't apply to **incoherent** sources, having different phases, for which the sound intensity LI will be used.

This module can be useful to estimate how much sound pressure level is obtained by placing two or more noise sources together (use the incoherent system).

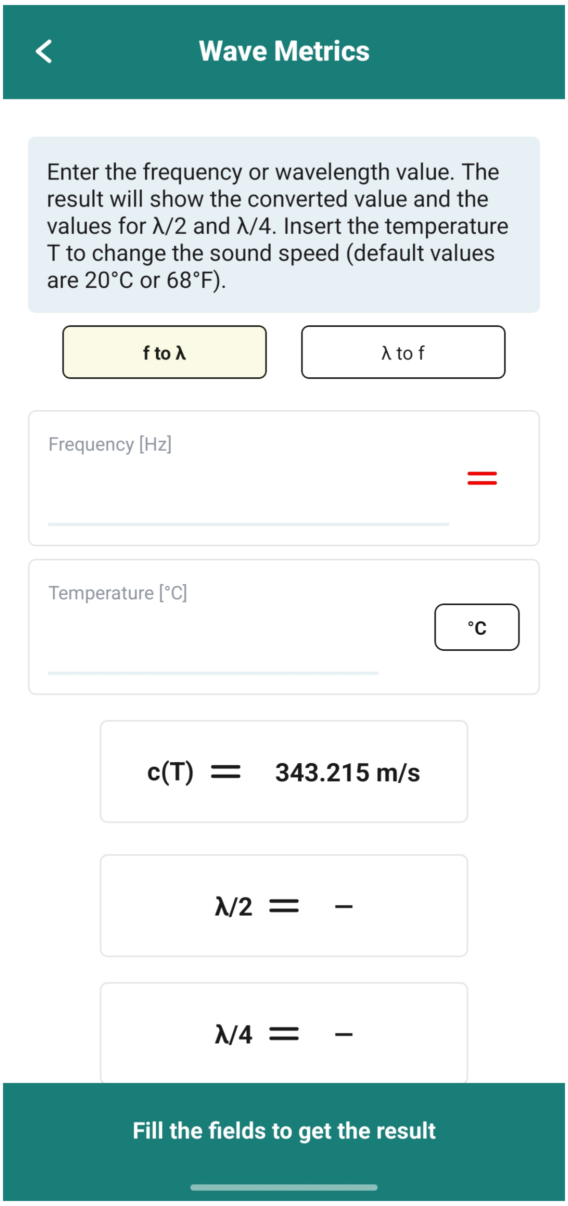
12. WAVE METRICS

NEW: The wave metrics module converts a given frequency value in its corresponding wavelength, and vice versa!

The user can also change the temperature, impacting the sound speed value. Moreover, by clicking on the temperature side button, the measurement system can be switched from SI units (meters and Celsius) to the Imperial units (ft and Fahrenheit).

The standard temperature values are 20°C and 68°F.

This module is useful for quickly obtaining the lambda value of a given frequency value, or the other way around, without having to manually compute the conversion.



(?). TUTORIAL

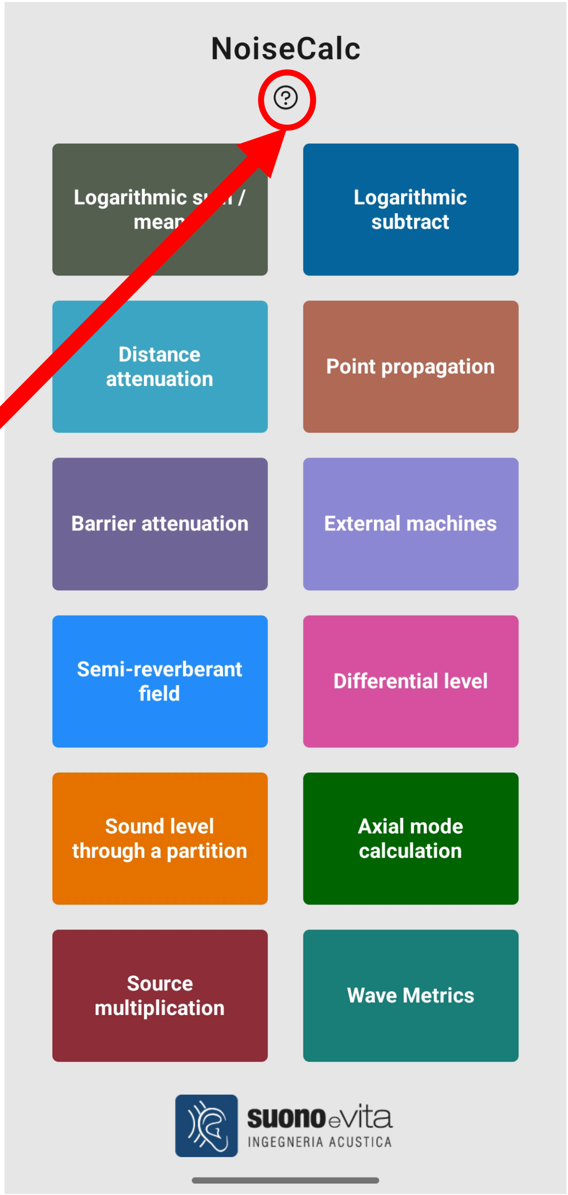
NEW: It is possible to view the app presentation through the application itself.

To access the presentation page, simply click on the question mark button on the homepage.

This shortcut is very useful if you have any doubts about how to use a specific module or need help understanding which tab to use based on your needs.

The presentation is available in both wide-screen format for PCs and vertical format for smartphones.

Find this presentation and much more on our website: www.suonoevita.it



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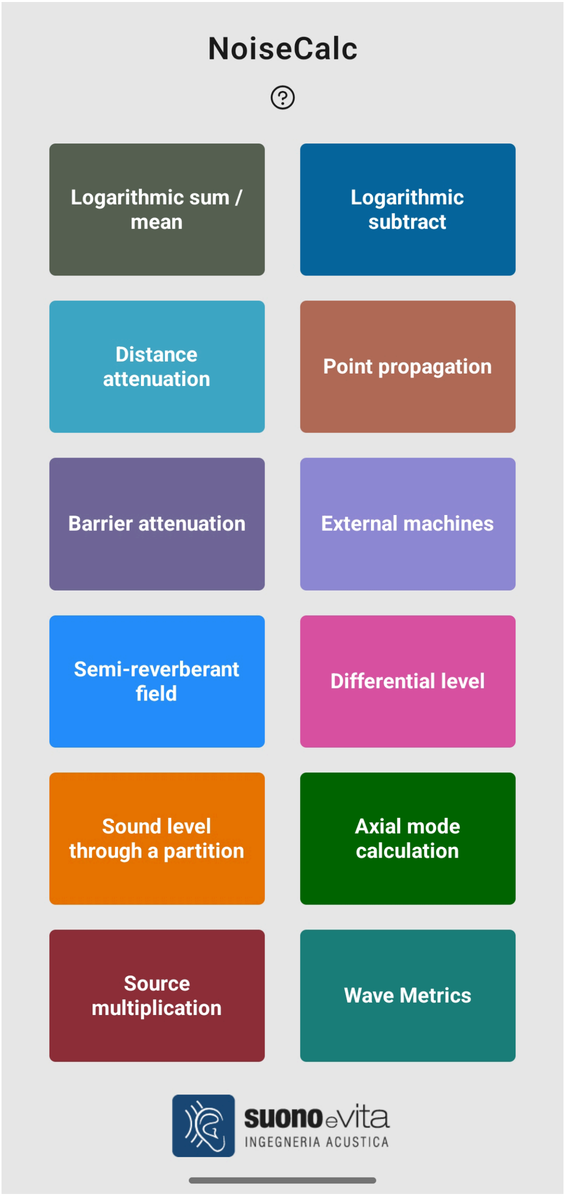
GLOSSARY

Energy level - is the sound level emitted by the source, propagated and/or measured at a point in space

Residual Level - This is the ' background' level that exists in a location without the sound source I am studying.

Administrative Laws – In Italy DPCM 14/11/97 regulates the limits of noise pollution. In Italy there is also all the legislation of the Civil Court which is more severe (art. 844 cc)

TCA - Competent Technician in Acoustics – Italian technical figure recognized by the Ministry of the Environment (ENTECA list) who can carry out SPL measurements and can draw up valid documents on the evaluation of noise pollution and passive acoustic requirements.



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CREDITS

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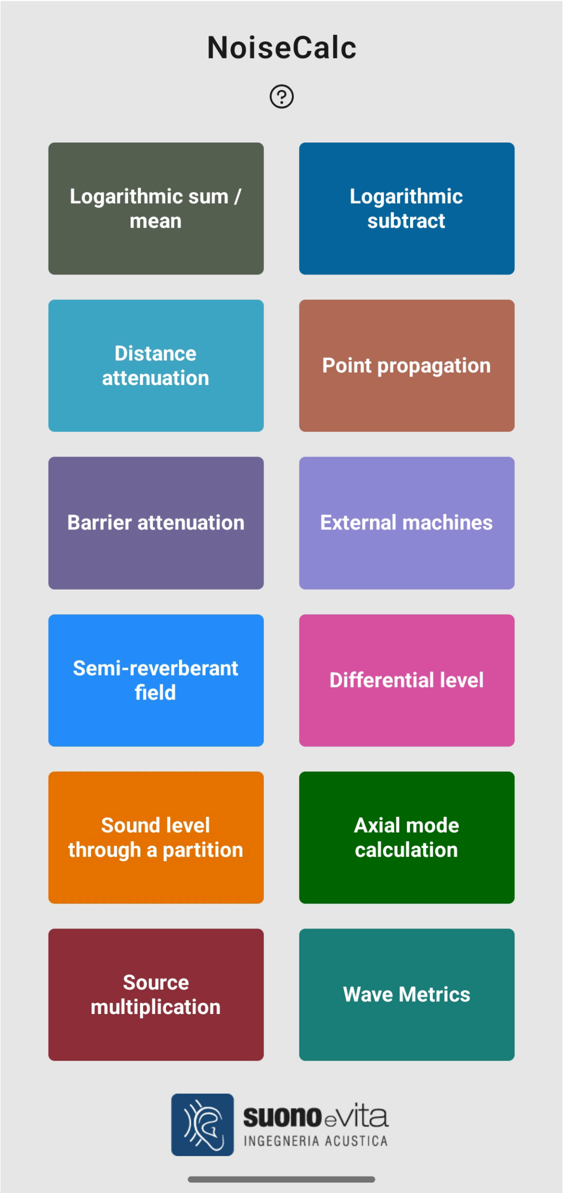
We thank the sponsors and colleagues who supported us in this free project.

For comments and suggestions, to ask to participate as a sponsor write an email to:
info@suonoevita.it



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