

# DYNAMIC PROCESSORS

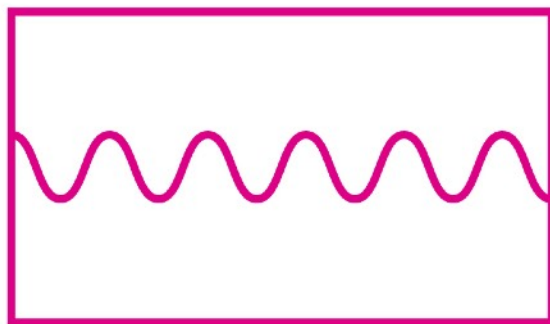
ENVELOPE FOLLOWER  
COMPRESSOR  
LIMITER  
EXPANDER  
GATE

TOMMASO ROSATI  
SOUND ART 

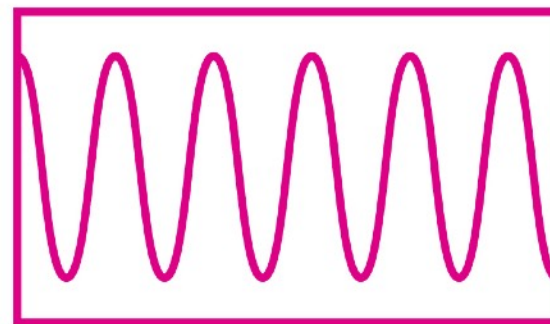


# DYNAMIC PROCESSORS

Dynamics processors affect the **amplitude parameter** of an incoming sound by processing it for technical or creative purposes.



Less amplitude

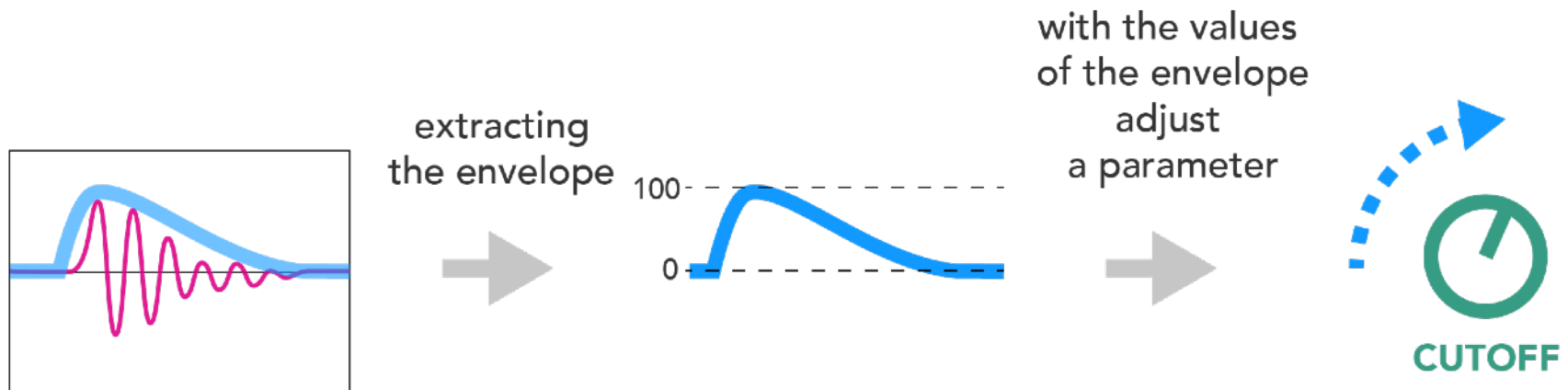


More amplitude

# ENVELOPE FOLLOWER

Or peak amplitude follower or envelope detector

The **envelope follower** or envelope detector **extracts the envelope** of an incoming sound by measuring the amplitude of positive peaks in the signal. This data produces a **control signal** that can then be applied to a parameter of another device.



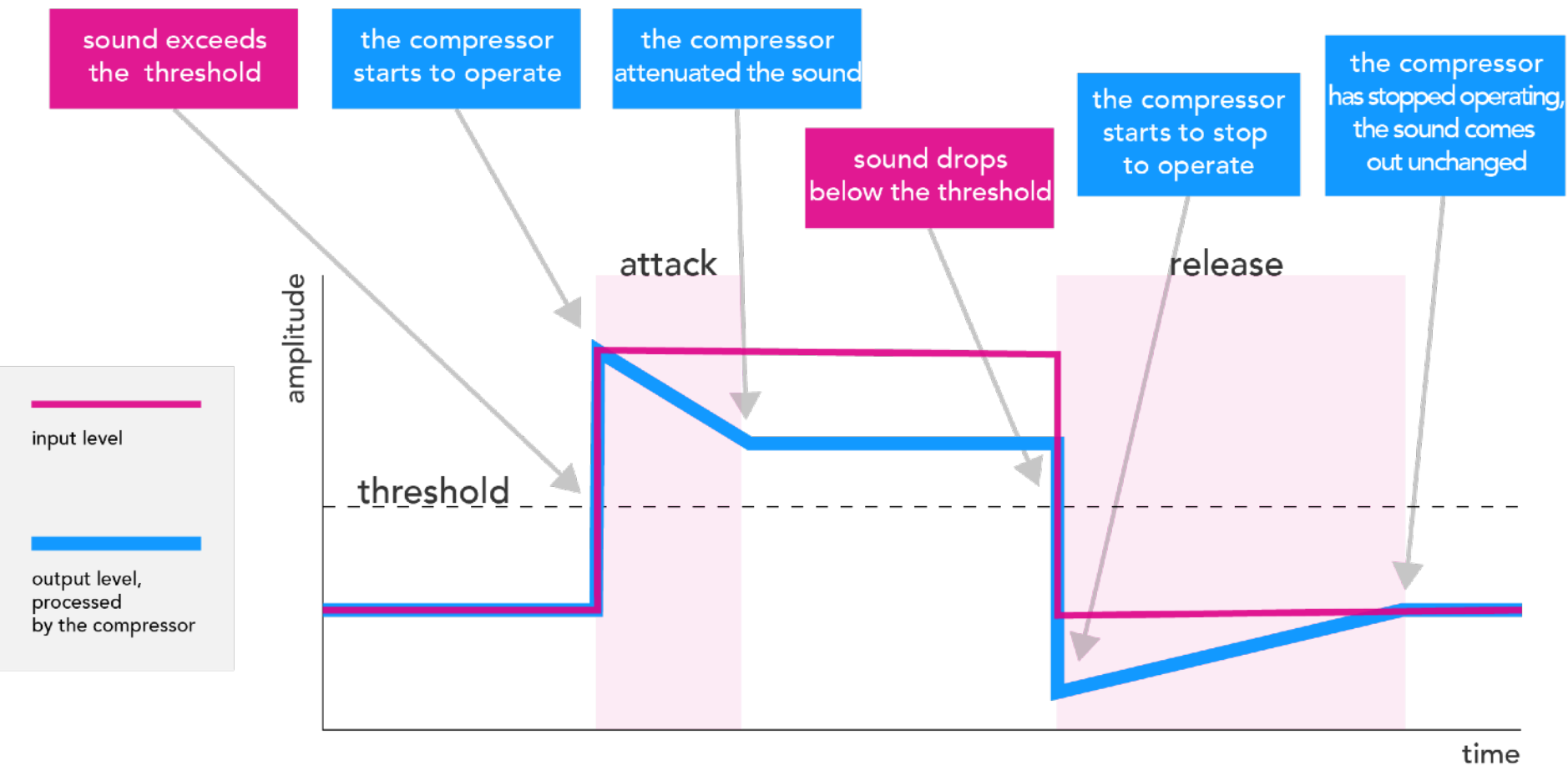
# COMPRESSOR

A **compressor** is a device used to reduce the **dynamic range** of a sound.

It operates in two steps:

- 1) **Measures** the amplitude of the incoming sound
- 2) **Attenuates** the output amplitude if it detects that a threshold is exceeded

# COMPRESSOR

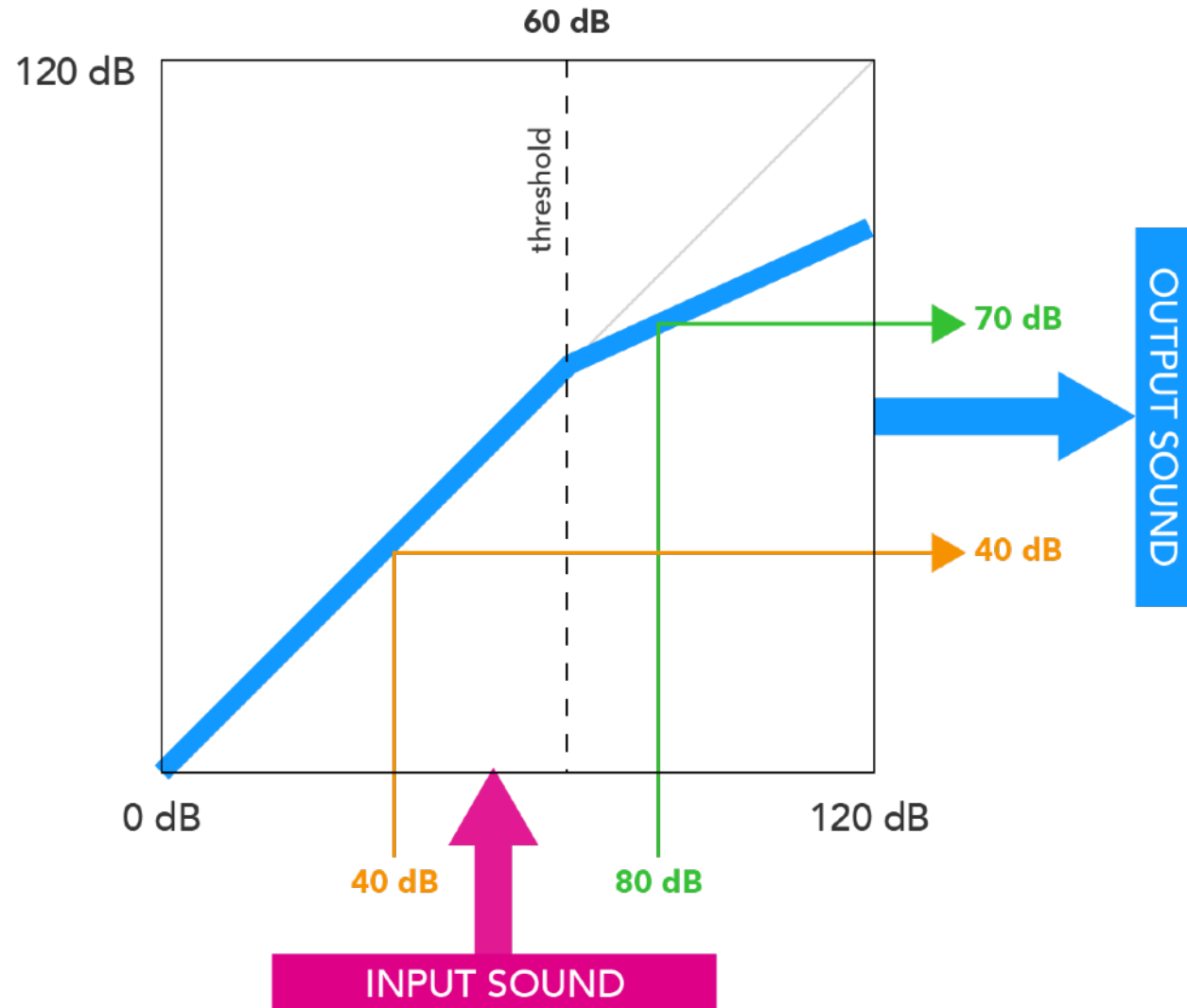


# COMPRESSOR

How to read a **transfer function**?

Input sound enters at 40dB, and because it is below the set threshold (60dB), the compressor does not act and brings the sound out at 40dB

This sound enters at 80dB, and as it exceeds the set threshold (60dB), the compressor acts by attenuating it to 70dB

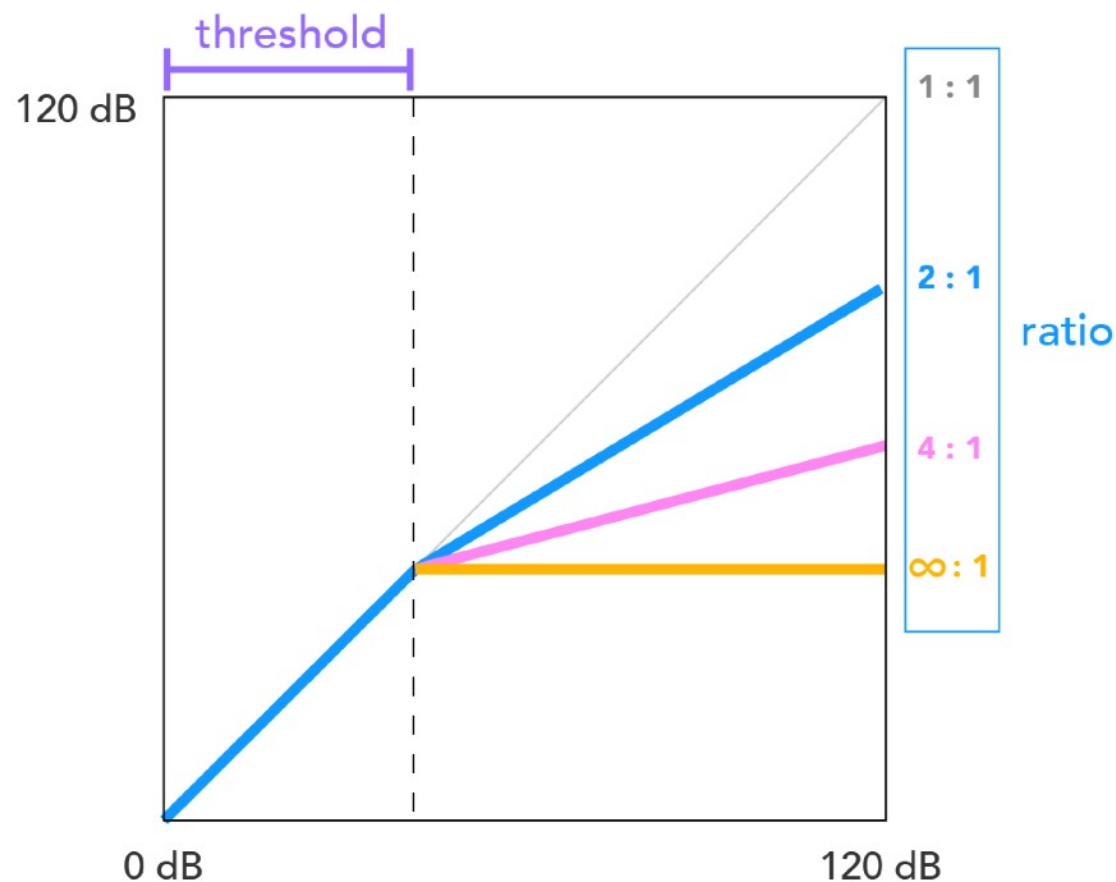


# COMPRESSOR

**parameters** of compressors:

**Threshold:** The threshold above which the compressor kicks in. It is measured in **dB**.

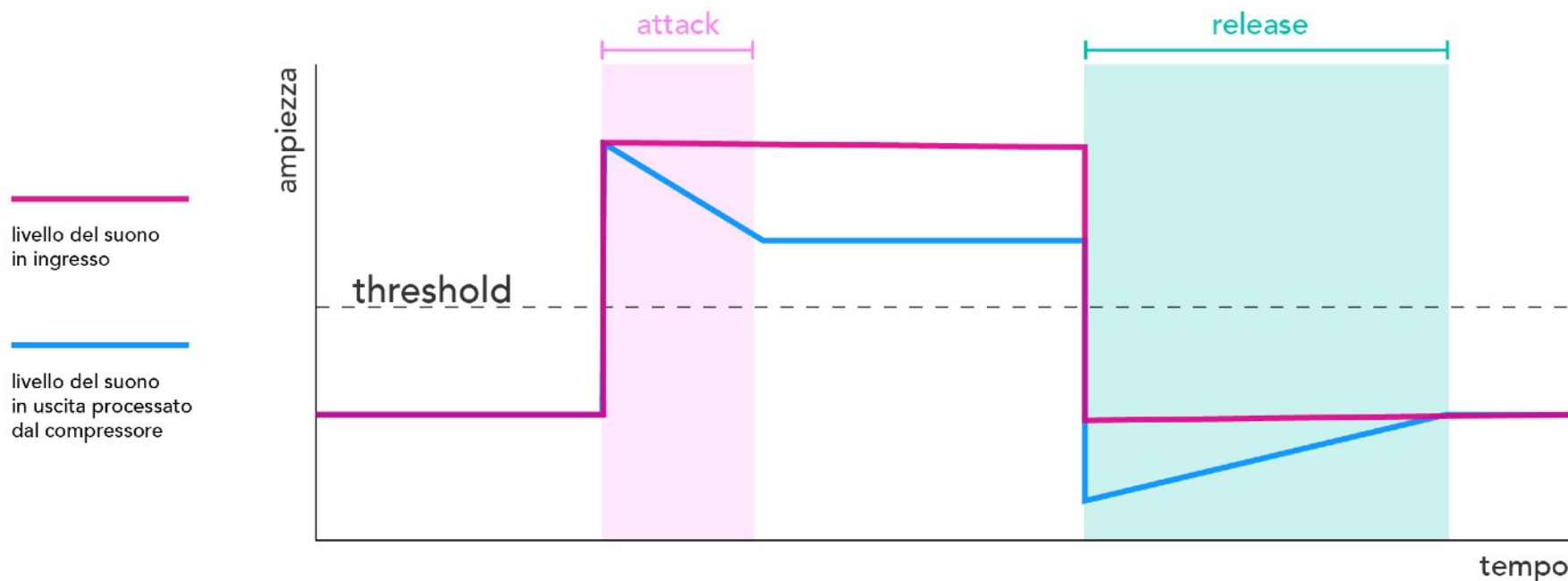
**Ratio:** how much the amplitude is rescaled. It is a **ratio between two numbers** like 3:1 o 5:1



# COMPRESSOR

**Attack** (time): Indicates the compressor action's trigger time starting when the sound exceeds the threshold. It is measured in milliseconds (**ms**).

**Release** (time): Indicates the compressor action's release time starting when the sound returns below the threshold. It is measured in milliseconds (**ms**).

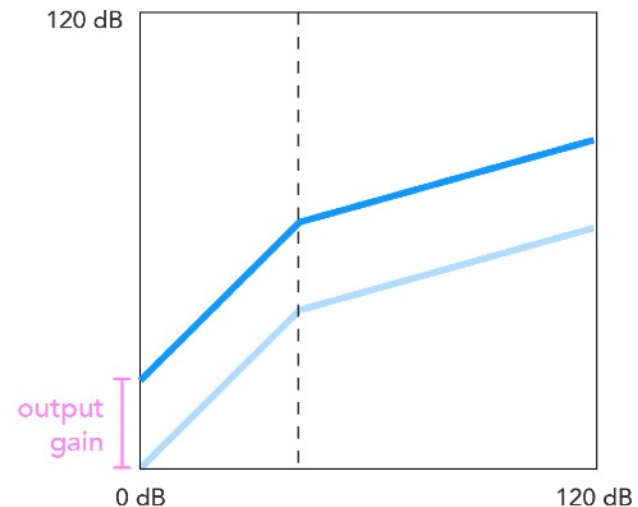
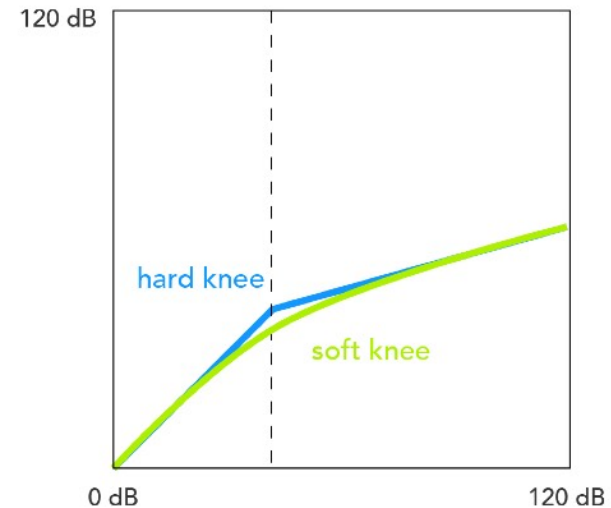




# COMPRESSOR

**Knee:** how blunt the angle of the response curve should become. It is measured in **dB**.

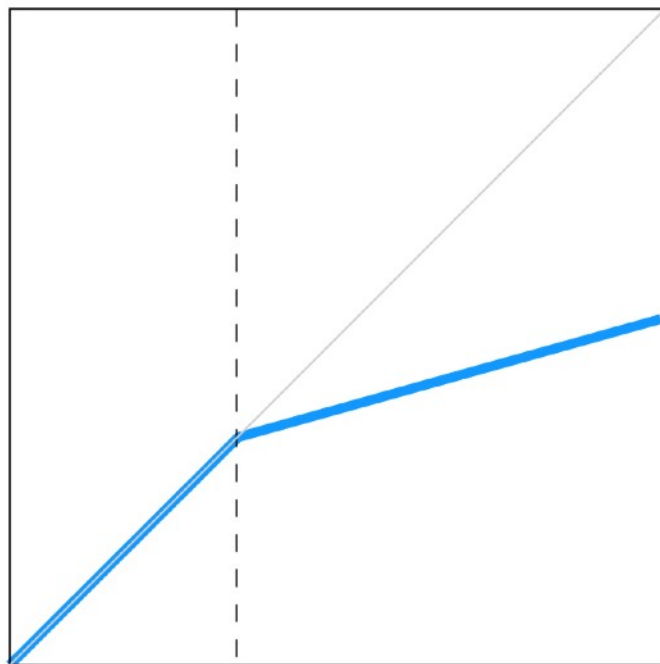
**Output gain or makeup gain:** additional amplification to the output sound, measured in **dB**.



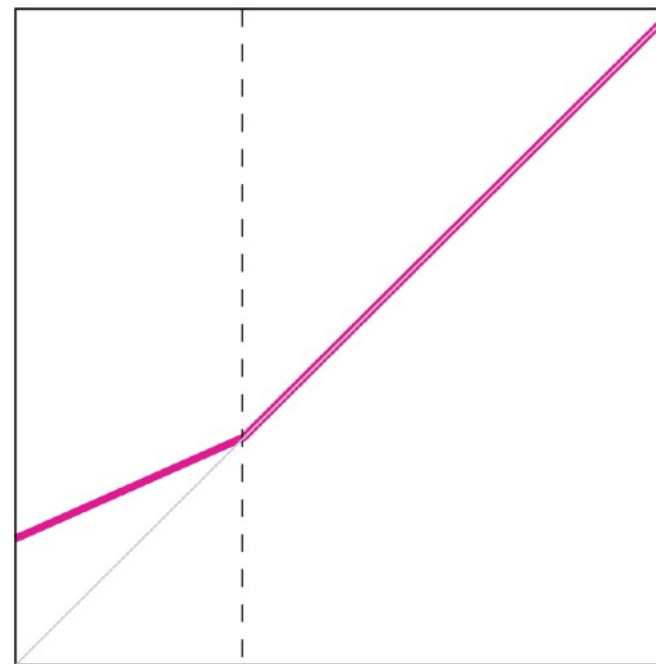
# DOWNWARD and UPWARD COMPRESSION

There are two types of compression:

**Downward compression:** amplitudes above the threshold are acted upon, attenuating them.

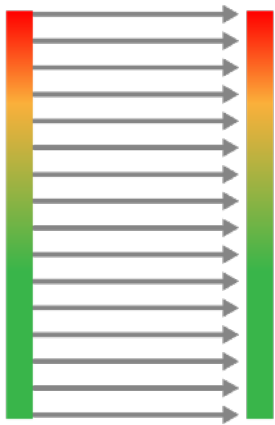


**Upward compression:** the amplitudes below the threshold are acted upon, emphasizing them.

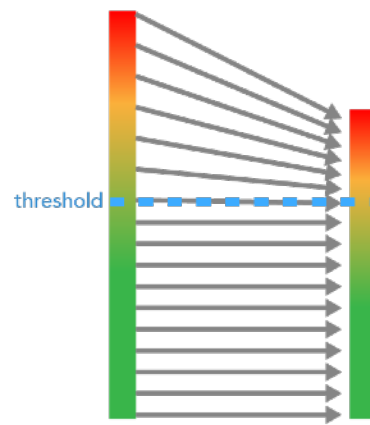


# DOWNWARD and UPWARD COMPRESSION

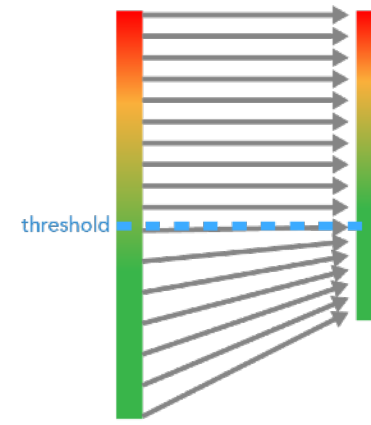
linear



downward compression



upward compression



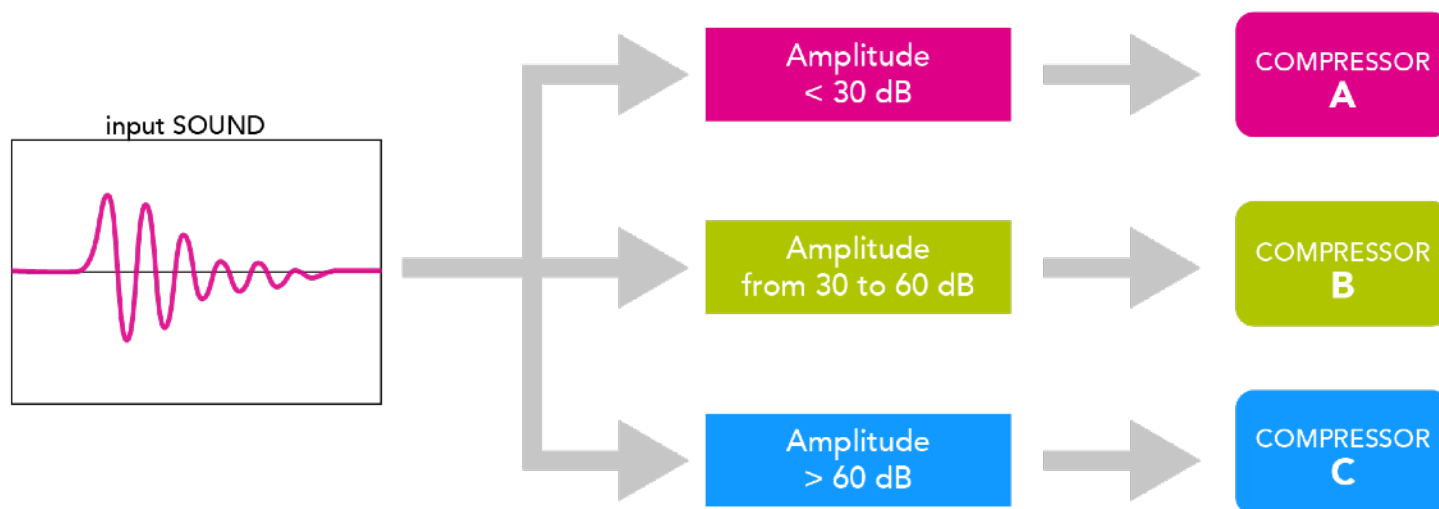
# MULTIBAND COMPRESSOR

It is a compressor that acts differently on parts of the sound. The sound is divided into "zones," and a different set of compressors processes each zone.

The zones can be based on the following:

## 1) On amplitudes

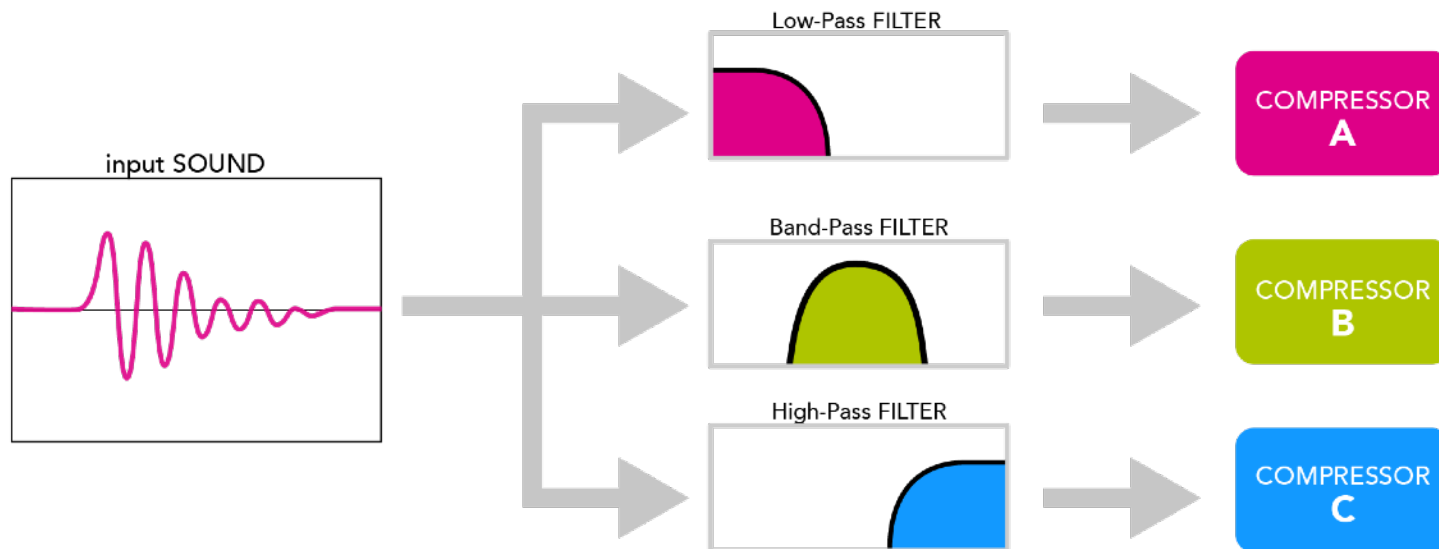
Different compressors are applied for different amplitude ranges.



# MULTIBAND COMPRESSOR

## 2) On frequencies

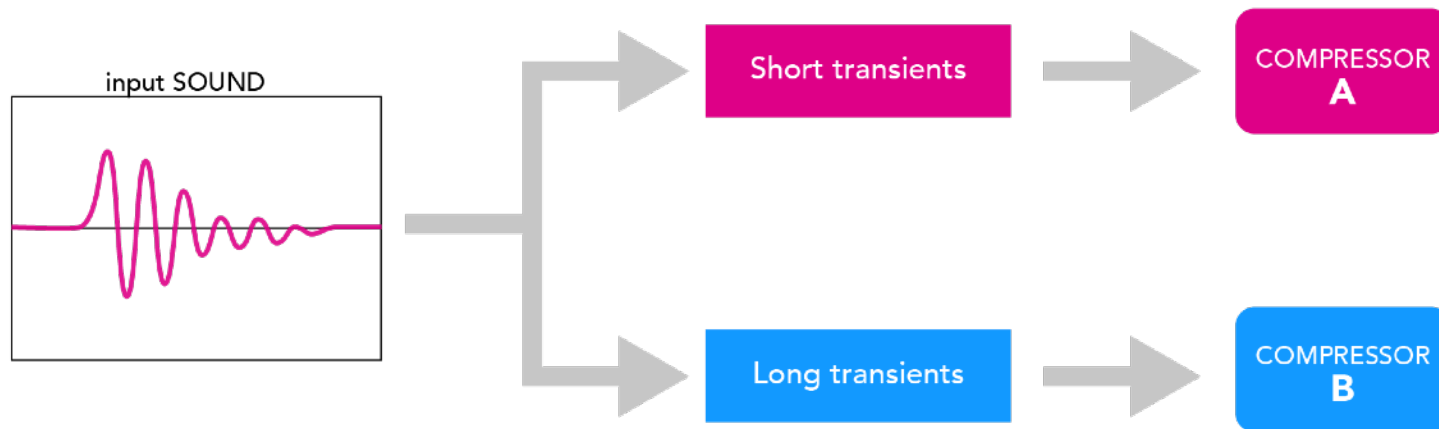
Different compressors are applied for different frequency bands. You then put one or more crossover filters before the compressors.



# MULTIBAND COMPRESSOR

## 3) On timing

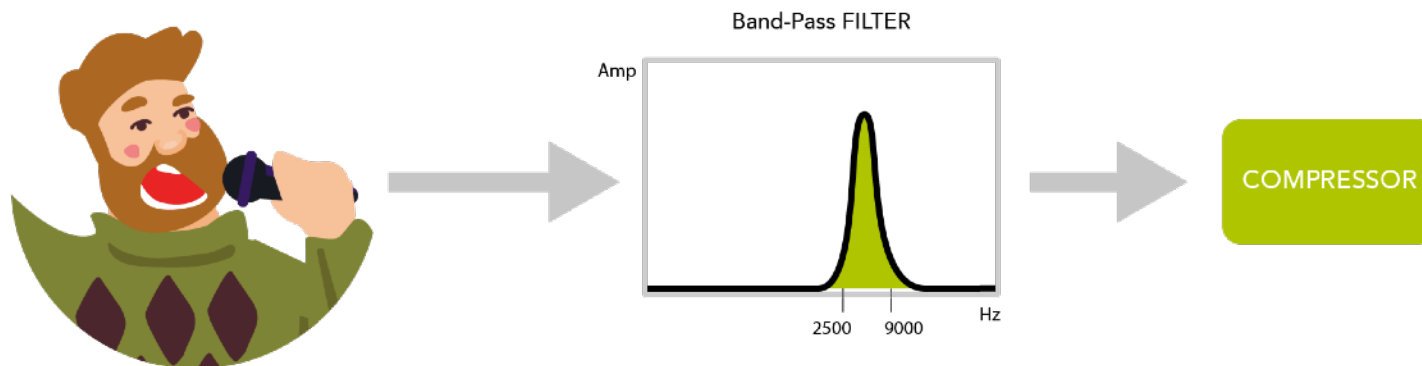
Different compressors are applied for different bands of transients (attacks).



# DE-ESSER

## Multiband Compressor

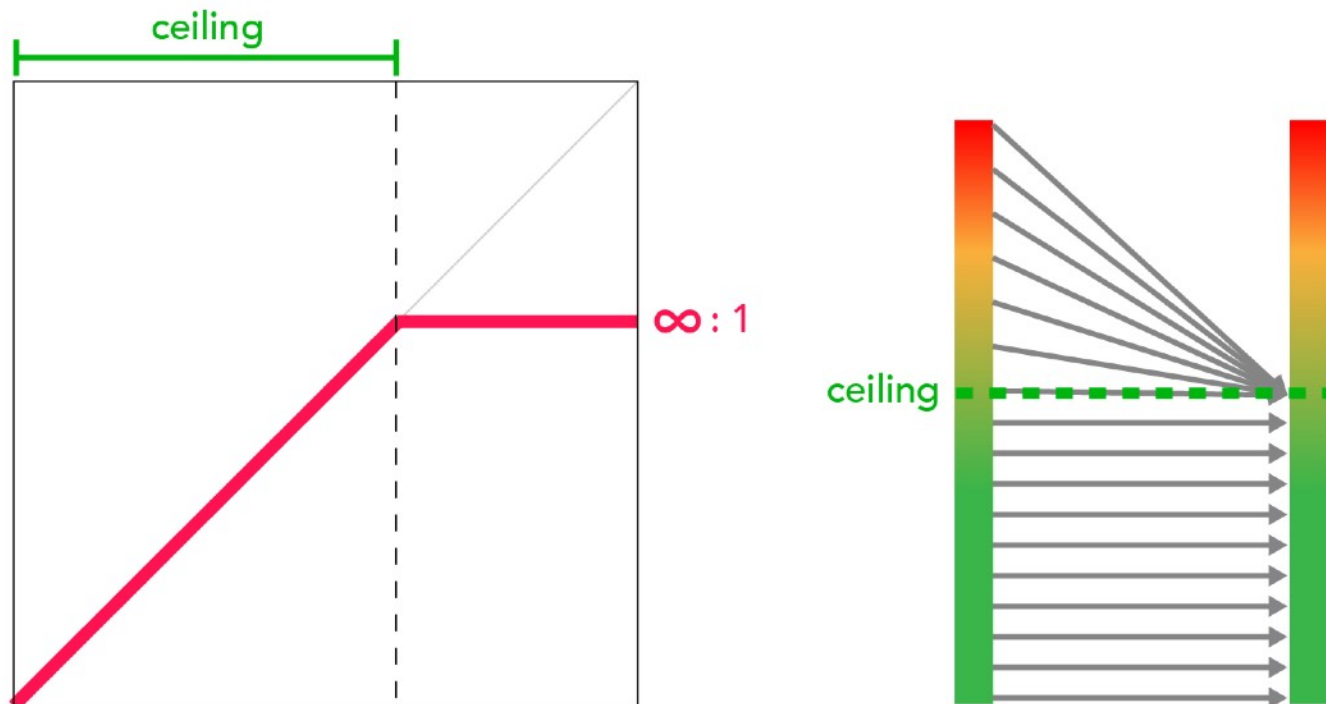
The **De-Esser** is a special type of multiband compressor that attenuates sibilant "S's" in recording vocals. It acts **ONLY** on the frequency band where the "S's" are located: 2.5 - 9 kHz.



# LIMITER

A **Limiter** is a special compressor that prevents dynamics above the threshold from passing through. It is a compressor with a very high ratio,  $>20:1$

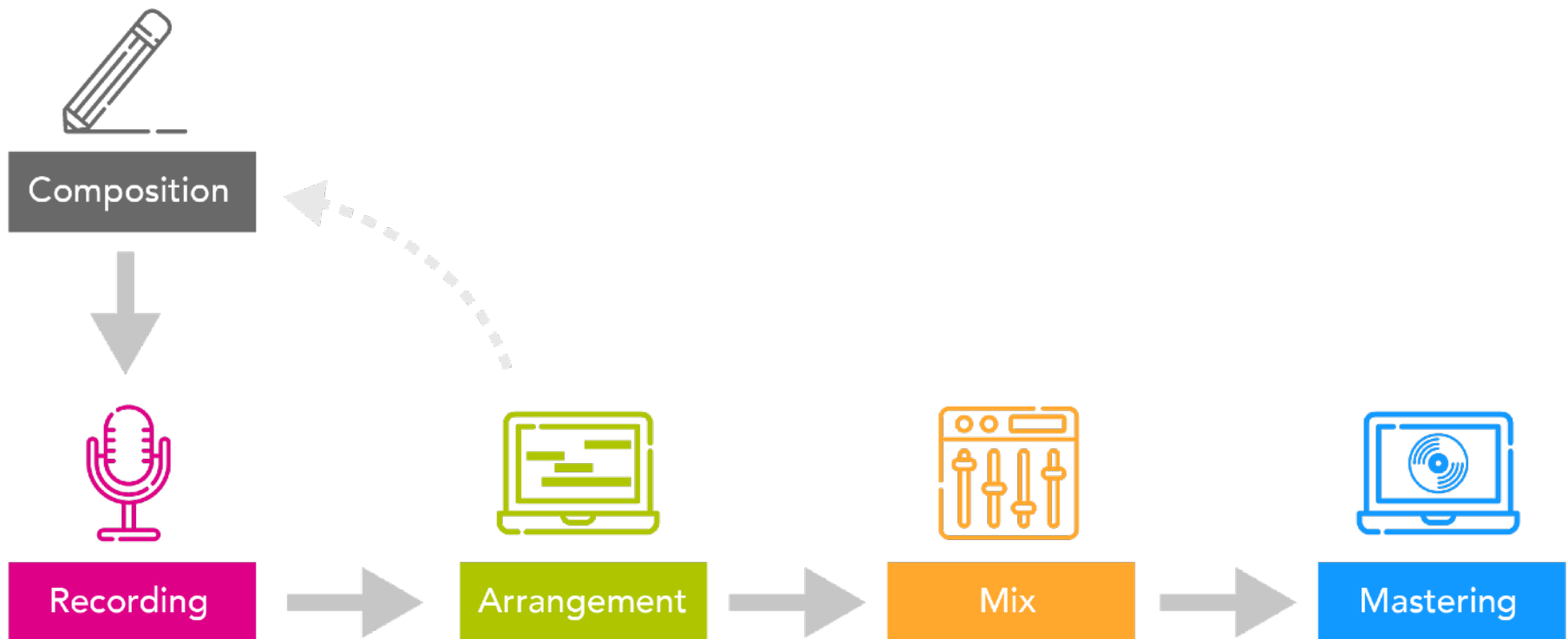
The threshold in a limiter is called **Ceiling**.





# LIMITER

It is used particularly in the **mastering** process

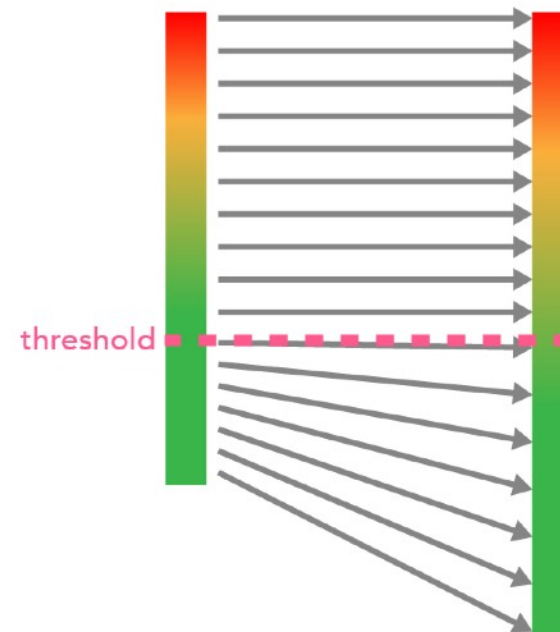
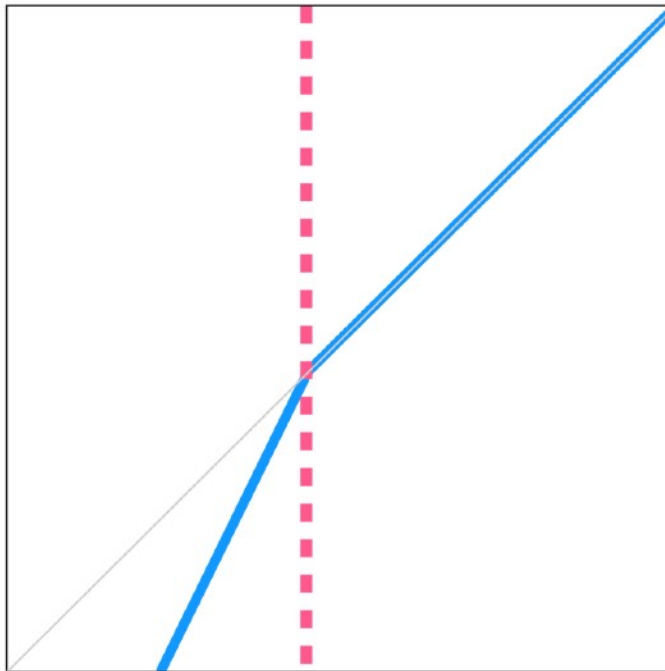


# EXPANDER

## Downward e Upward expander

The **Expander** works by reducing the gain of sounds below the threshold. This widens the range between the dynamics of input sound, so there will be a more extensive range of dynamics between the lowest and the highest dynamics.

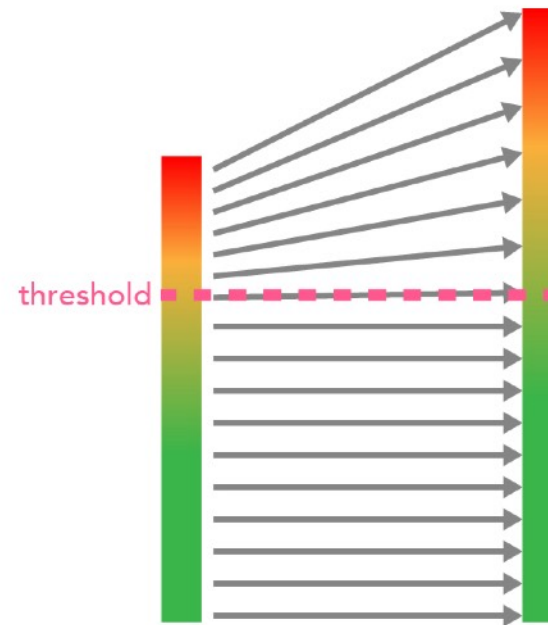
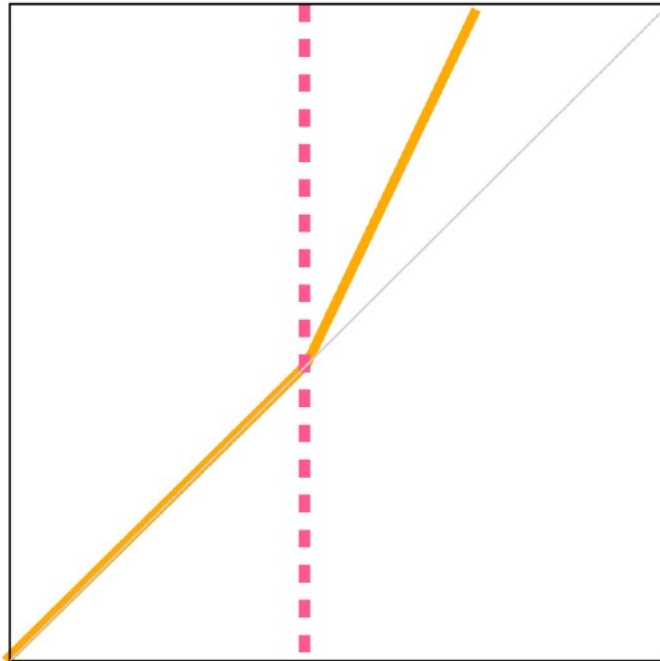
It can affect low dynamics: **downward expansion**



# EXPANDER

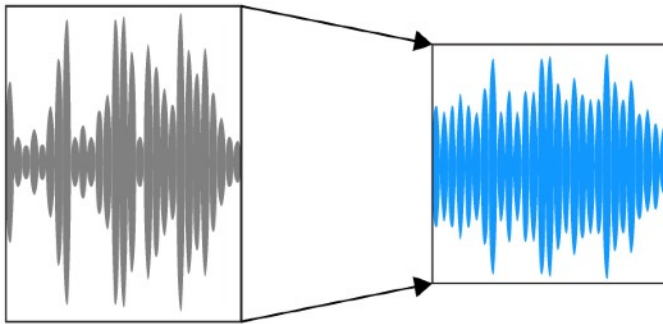
Downward e Upward expander

Or High dynamics: **upward expansion**

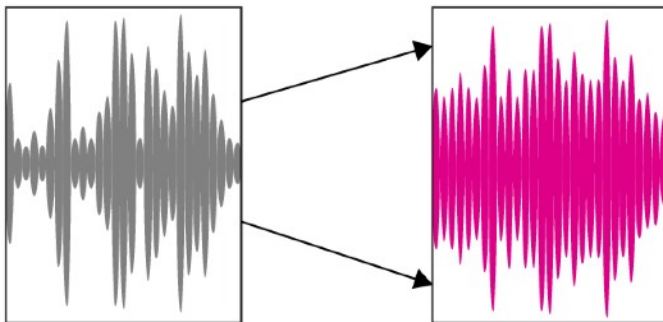


# COMPRESSOR

downward compression

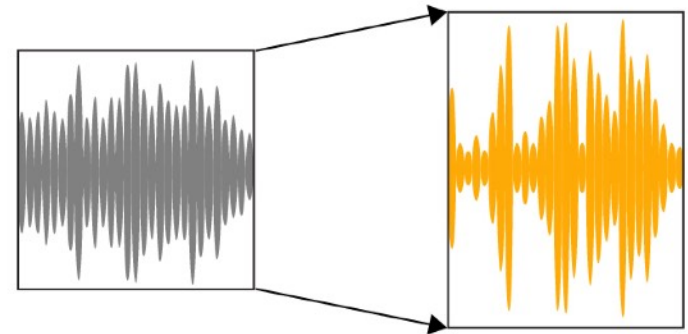


upward compression

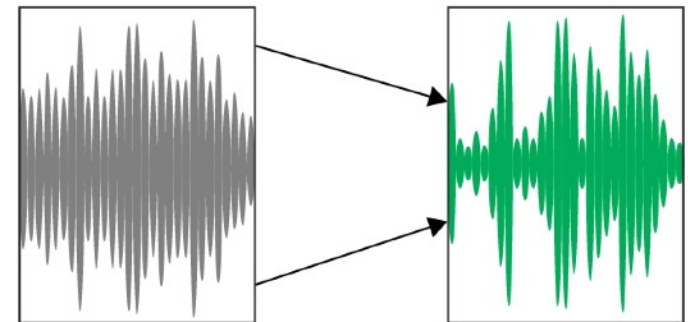


# EXPANDER

upward expansion

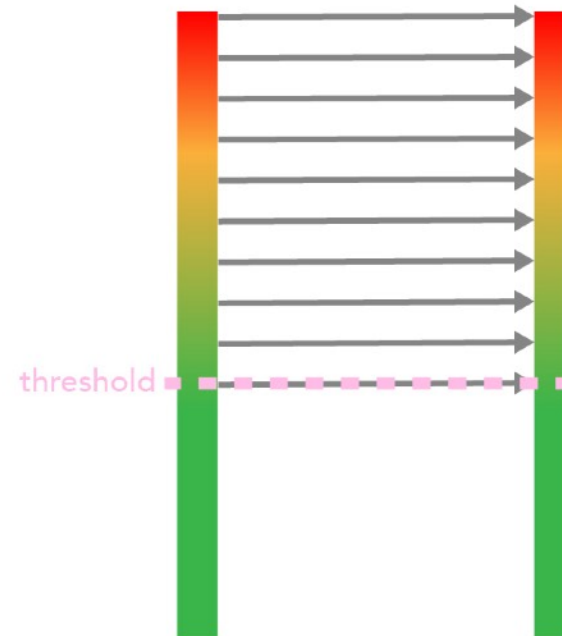
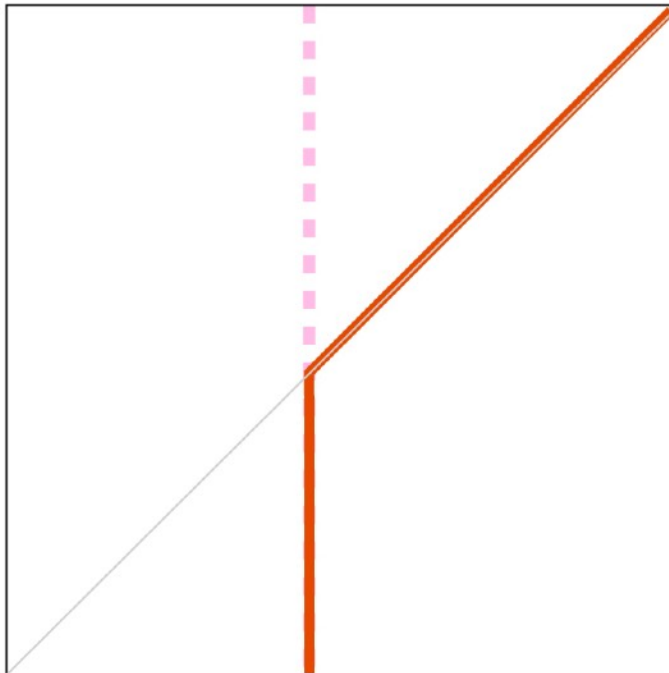


downward expansion



# GATE

A **Gate** is a dynamic processor that eliminates sound below a predetermined threshold.





[www.tommasorosati.it](http://www.tommasorosati.it)