

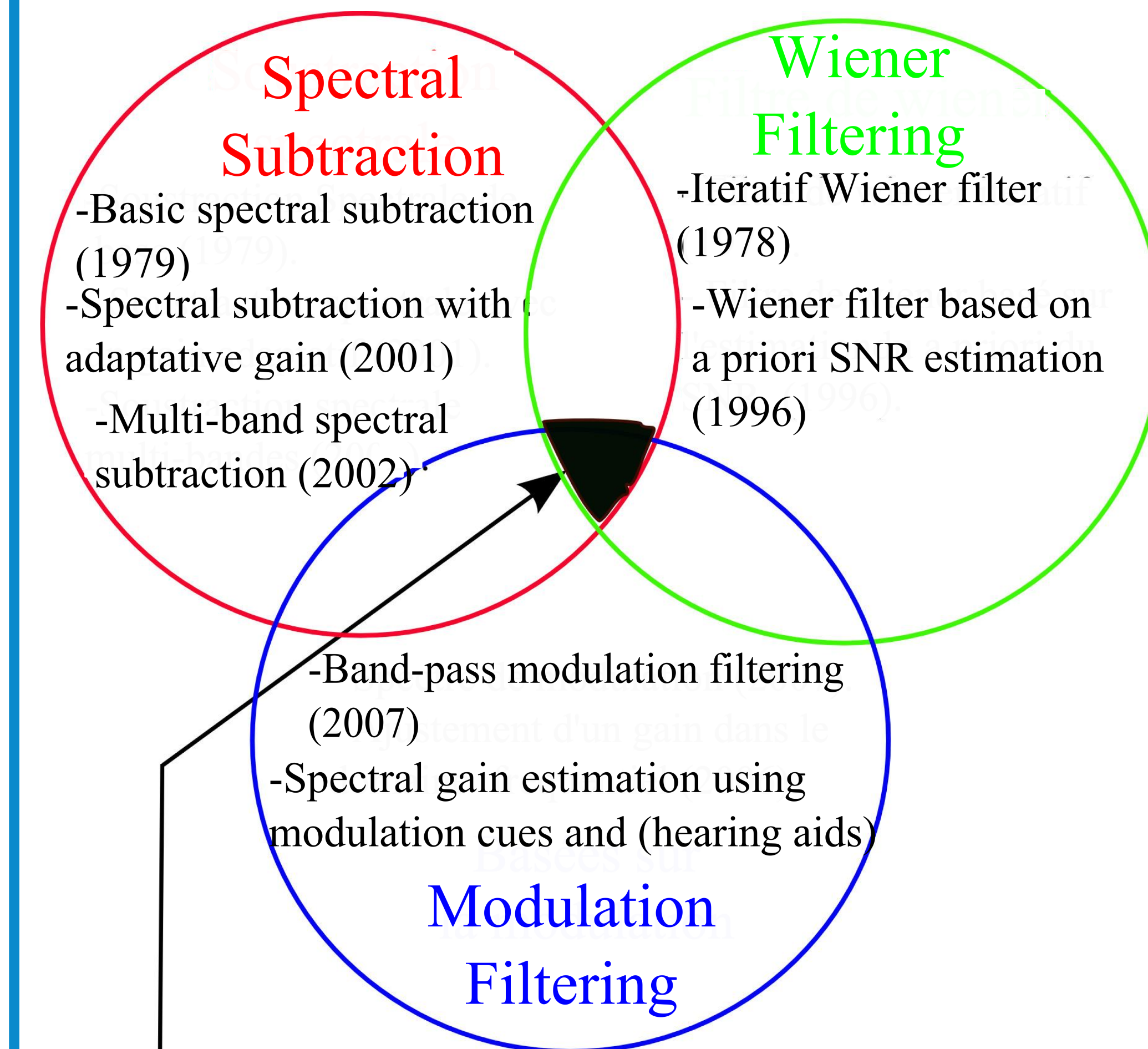
A DEMONSTRATION OF A SINGLE CHANNEL BLIND NOISE REDUCTION ALGORITHM WITH LIVE RECORDINGS

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1- BACKGROUND

Noise Reduction

Noise reduction algorithms are nowadays used in multiple areas such as hearing aids, cochlear implants, telecommunication systems and human/robot interaction devices.



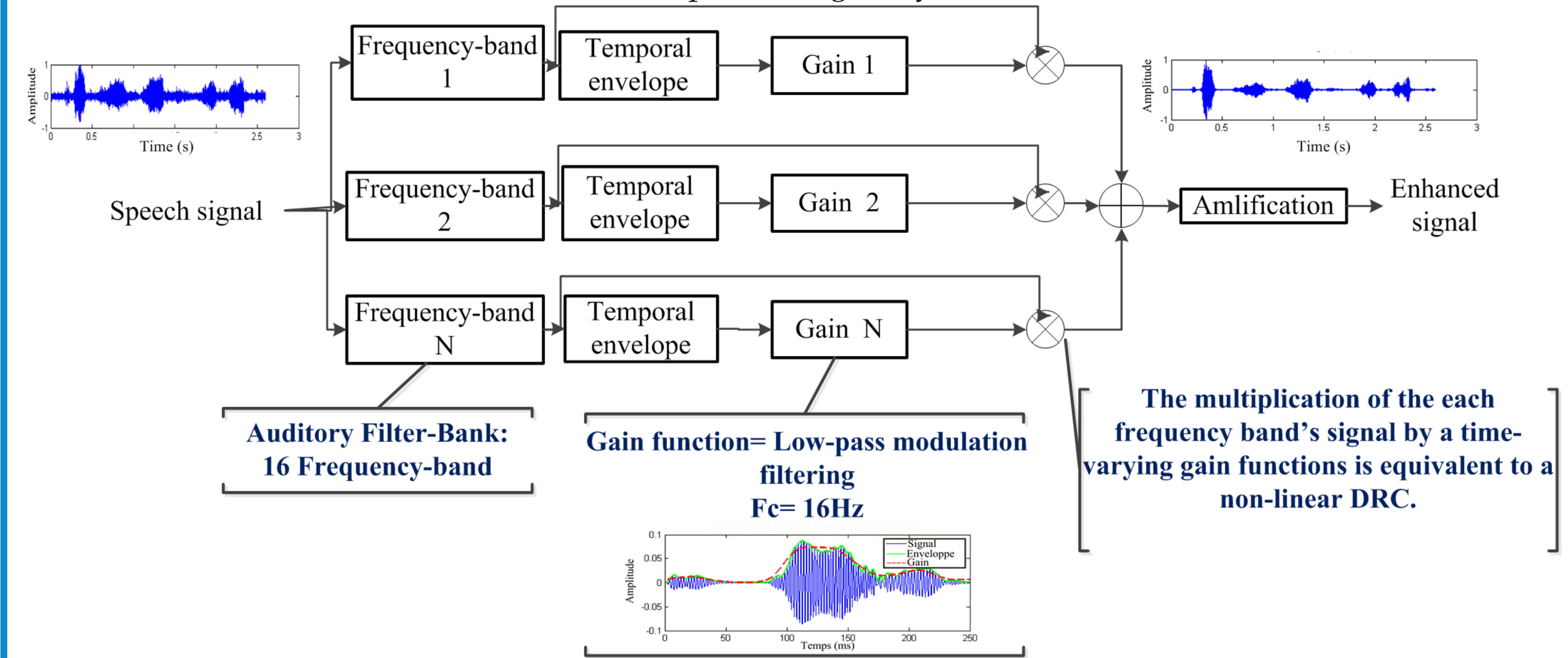
Issues with most of the current single channel noise reduction algorithms:

- The use of *a priori* information for the estimation of the signal-to-noise ratio (SNR) or the noise parameters.
- Noise reduction at each frequency bin (in the spectral domain), which introduces musical noise and artefacts which are in some cases perceptually more annoying than the background noise itself.

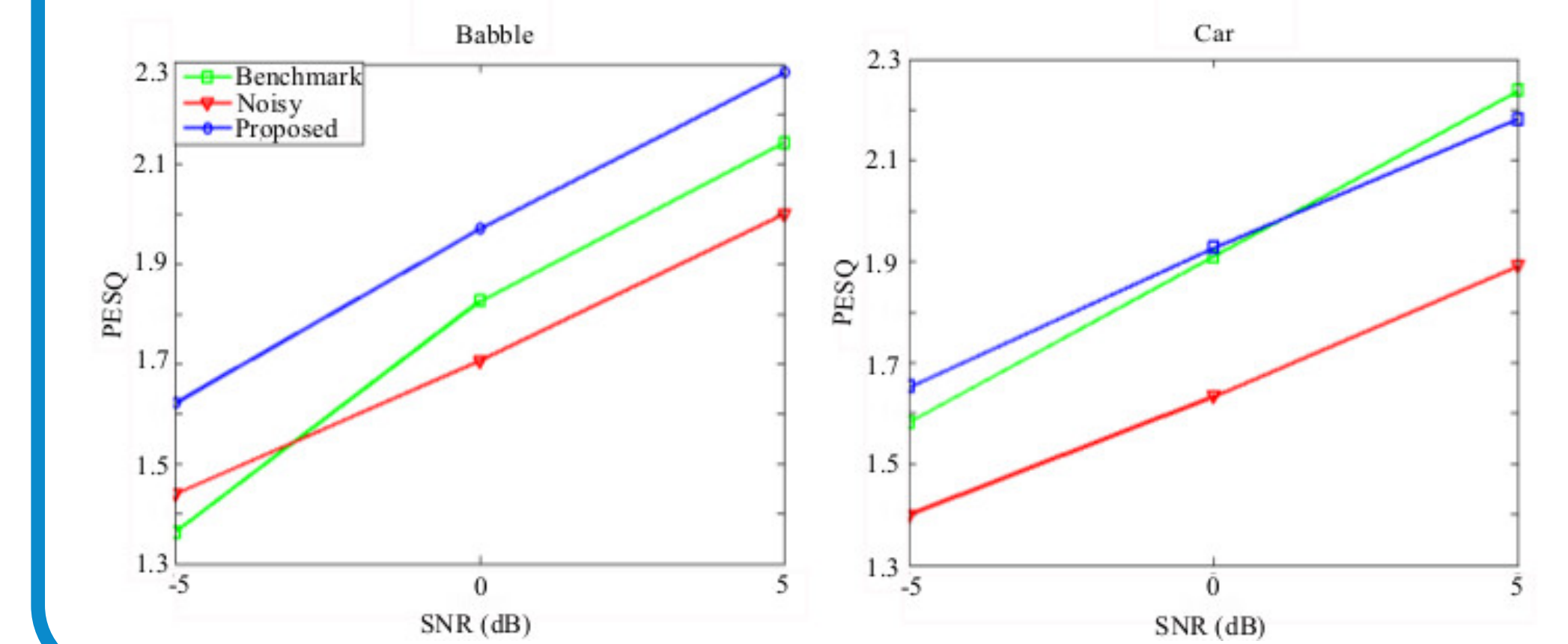
2- THE PROPOSED BLIND NOISE REDUCTION METHOD

Idea

In [1], a dynamic range compression (DRC) based on the use of a frequency-band dependant and time-varying gain function. This concept can be used in some audio processing systems such as noise reduction.



4- RESULTS



5- CONCLUSIONS

- Signal quality improvement.
- Noise reduction with the least of musical noise generation.

Originality

- The proposed method does not require *a priori* information or noise parameters estimation.
- The use of a time-varying and frequency-band dependant gain function reduces the background noise and enhances the quality of the signal.

3- OBJECTIVE QUALITY ASSESSMENT

1- Database used

30 speech signals from the NOIZEUS database [2], corrupted by "car" and "babble" noises in 5, 0, and -5 dB SNR.

2- Evaluation Metric

The PESQ (Perceptual Evaluation of Speech Quality) metric is used for the objective evaluation of the proposed method [3].

3- Benchmark Algorithm

The proposed method is compared to the band-pass modulation filtering algorithm proposed in [4].

6- REFERENCES

[1] D. V. Anderson, "A modulation view of audio processing for reducing audible artifacts," ICASSP 2010.
 [2] Y. Hu and P. C. Loizou, "Evaluation of objective quality measures for speech enhancement," IEEE Transactions on audio, speech, and language processing, 2008.
 [3] ITU-T, "Subjective test methodology for evaluating speech communication systems that include noise suppression algorithm.," 2003.
 [4] T. H. Falk, S. Stadler, W. B. Kleijn, and W.-y. Chan, "Noise suppression based on extending a speech-dominated modulation band," in INTERSPEECH 2007.

