



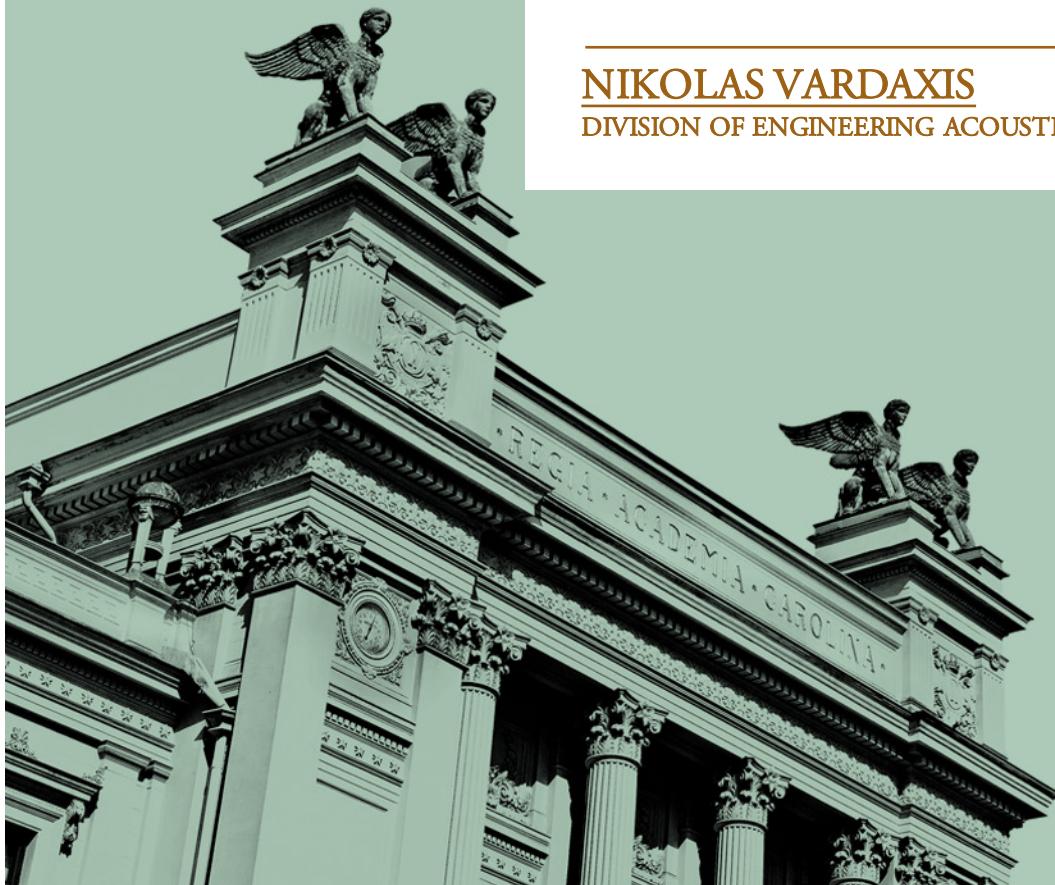
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Acoustics (VTAN01)

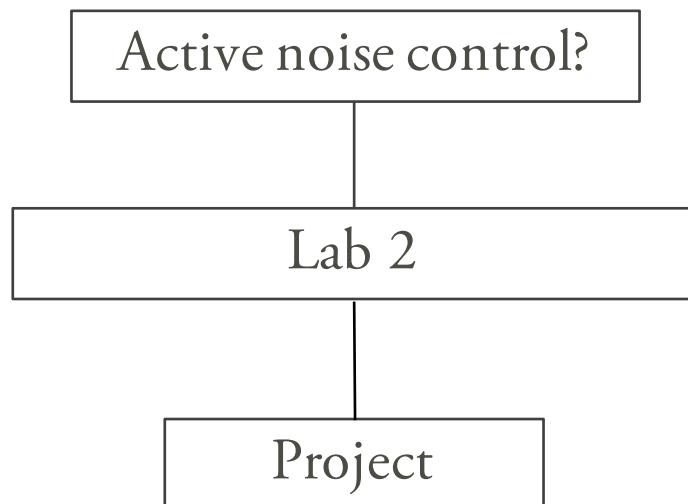
– Lab 2(Comments)

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Outline



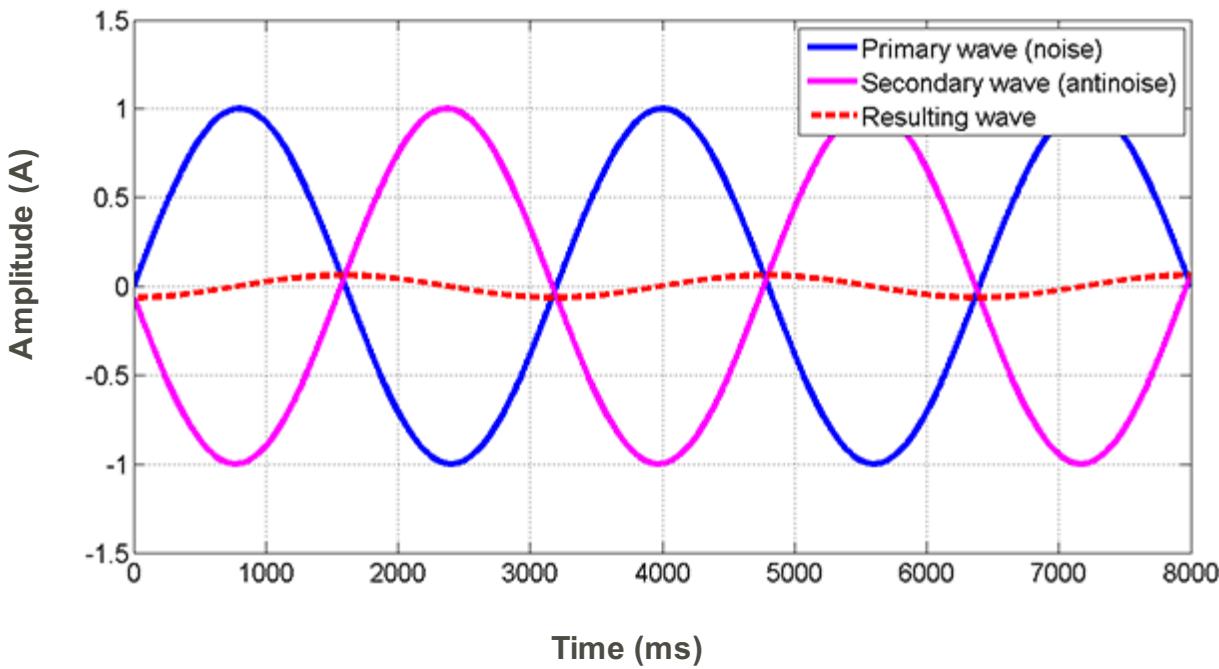
Active noise control

- Application of canceling noise without passive solutions
 - » But with a system of intervention, an anti-source



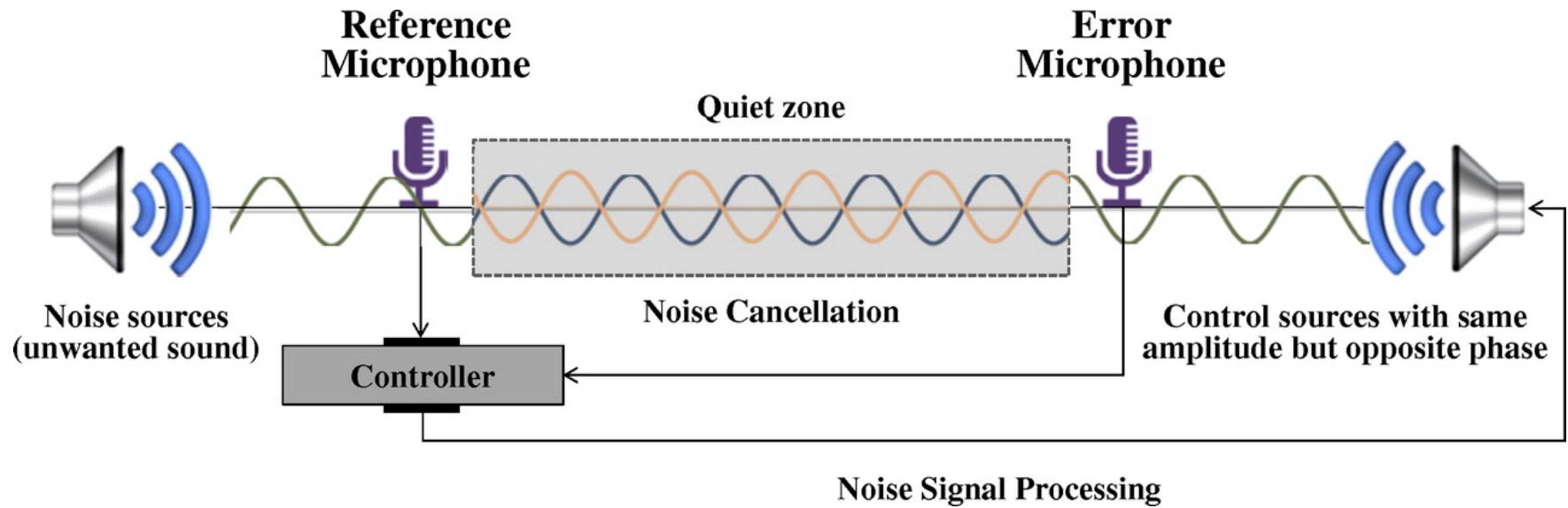
Active noise control

- Using waves of same frequency and amplitude
- BUT with inverted phase!



Active noise control

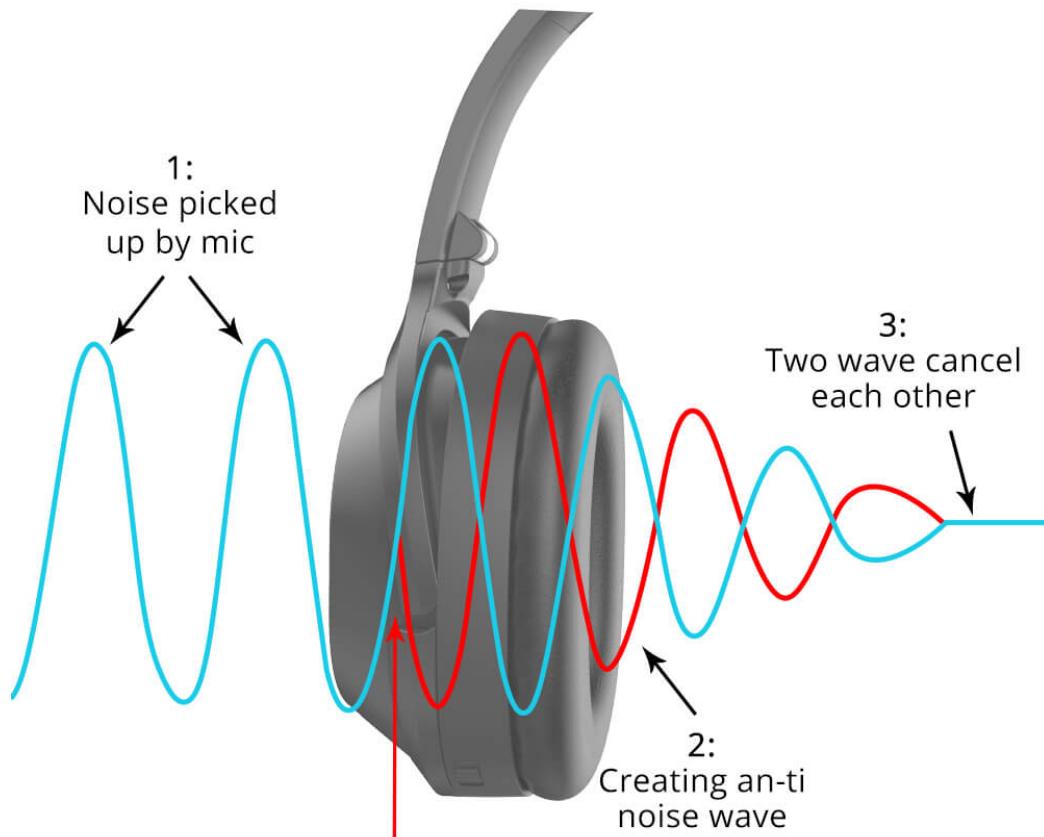
- How does it work technically?
 - Noise source vs. Control source
 - Reference Microphone vs. Error Mic



Active noise control

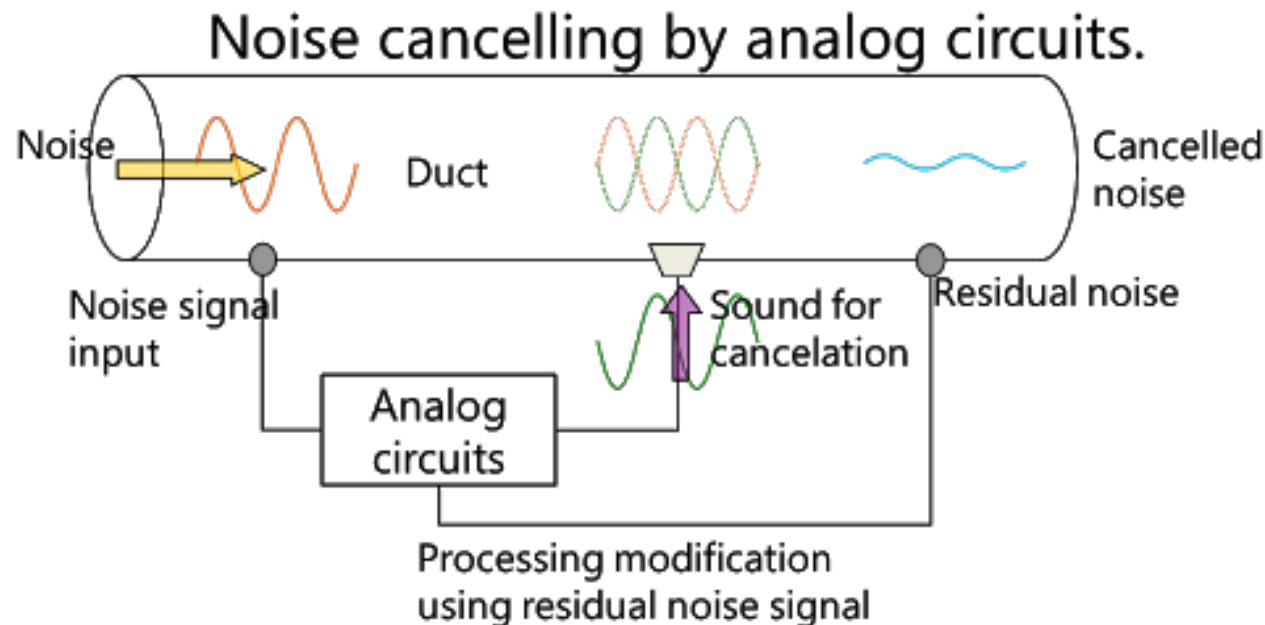
- Application of canceling noise without passive solutions

ACTIVE NOISE CANCELLATION



Active noise control

- How does it work technically?
 - Noise source vs. Control source
 - Reference Microphone vs. Error Mic



Active noise control

- Applications
 - Ventilation systems
 - Cars, trucks
 - Headphones
 - Industrial machinery (noisy)
 - » Example: Computer server cabinets



Lab 2 comments

- General writing tips
 - » Don't hide
 - » Be proud of yourself

Laboratory 2

Measurement of impact sound insulation

VTAN01 Acoustics

30th of November 2020

Group

Lab 2 comments

Table 3: Calculated impact sound level

freq [Hz]	L _{r,avg}	L _{n,avg}
50	67,5	63,4
63	68,0	63,9
80	67,9	64,9
100	76,5	74,5
125	66,5	65,8
160	67,1	66,9
200	63,6	63,2
250	62,7	62,1
315	62,4	61,5
400	62,8	61,7
500	62,1	61,1
630	60,2	59,4
800	58,9	58,6
1000	57,1	56,7
1250	52,1	51,9
1600	49,3	49,3
2000	47,2	47,4
2500	40,4	41,1
3150	32,1	33,4
4000	28,2	30,0
5000	22,1	24,3

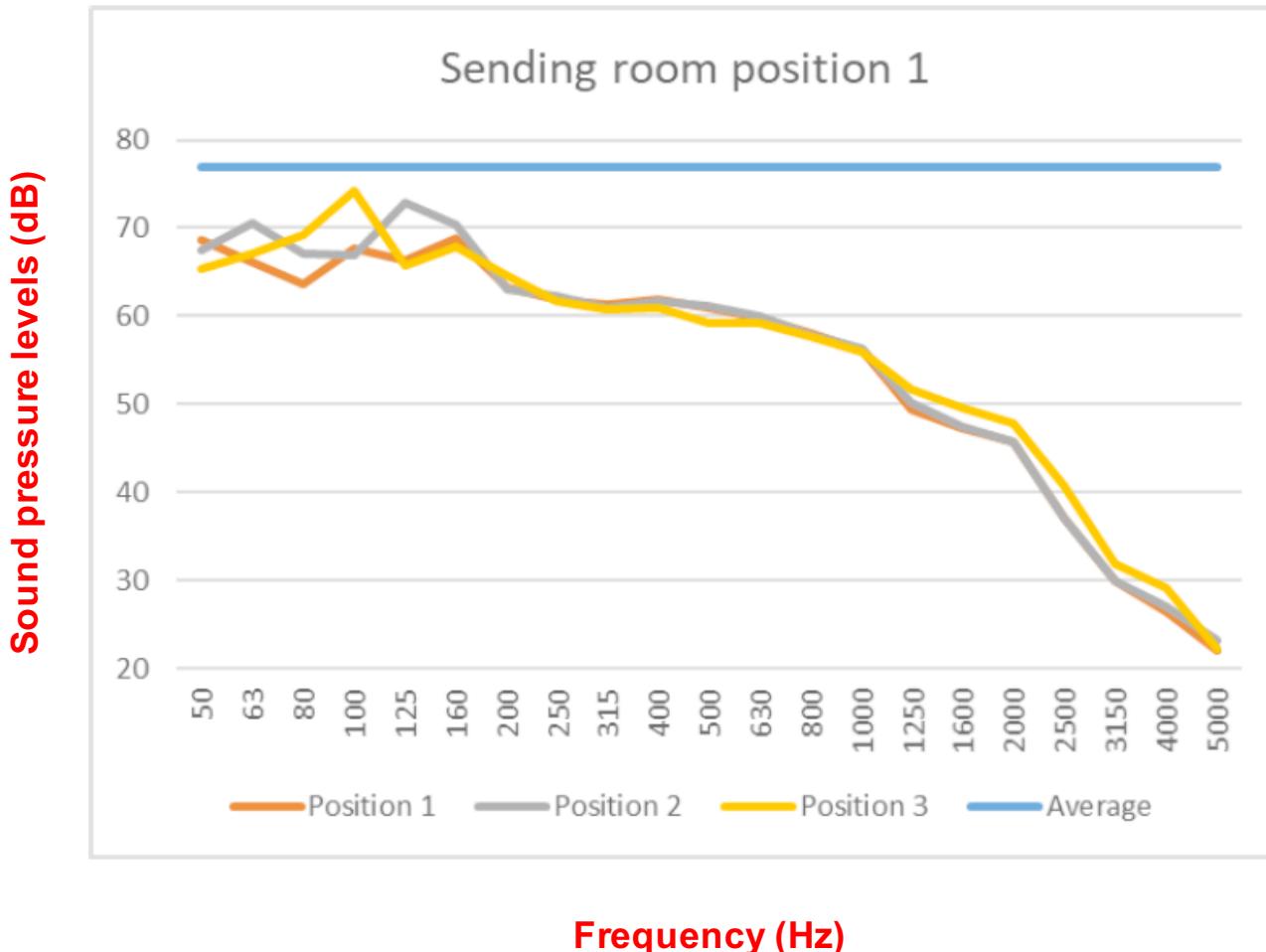
The weighted impact sound level, as well as the spectrum adaptation term was calculated using the template for calculations according to SS-ISO 717-2 using the impact sound level, rounded to one decimal as presented in table 3.

Table 4: Calculation of weighted impact sound level

Frequency [Hz]	L _{n' / Ln} [dB]	Reference [dB]	Shifted Ref. [dB]	Deviations [dB]	Unfavourable Deviations [dB]
50	63,4				
63	63,9				
80	64,9				
100	74,5	62	62	12,50	12,50
125	65,8	62	62	3,80	3,80
160	66,9	62	62	4,90	4,90
200	63,2	62	62	1,20	1,20
250	62,1	62	62	0,10	0,10
315	61,5	62	62	-0,50	0,00
400	61,7	61	61	0,70	0,70
500	61,1	60	60	1,10	1,10
630	59,4	59	59	0,40	0,40
800	58,6	58	58	0,60	0,60
1000	56,7	57	57	-0,30	0,00
1250	51,9	54	54	-2,10	0,00
1600	49,3	51	51	-1,70	0,00
2000	47,4	48	48	-0,60	0,00
2500	41,1	45	45	-3,90	0,00
3150	33,4	42	42	-8,60	0,00
4000	30,0				
5000	24,3				
				0	25,30
				Downward Shift [dB]	Sum of unfavourable deviations (must be maximal while not exceeding 32 dB)
					L _{nw} 60

- No one sees those Tables for every value
- They are good only to put them in the Appendix
- → MAKE PLOTS!

Lab 2 comments

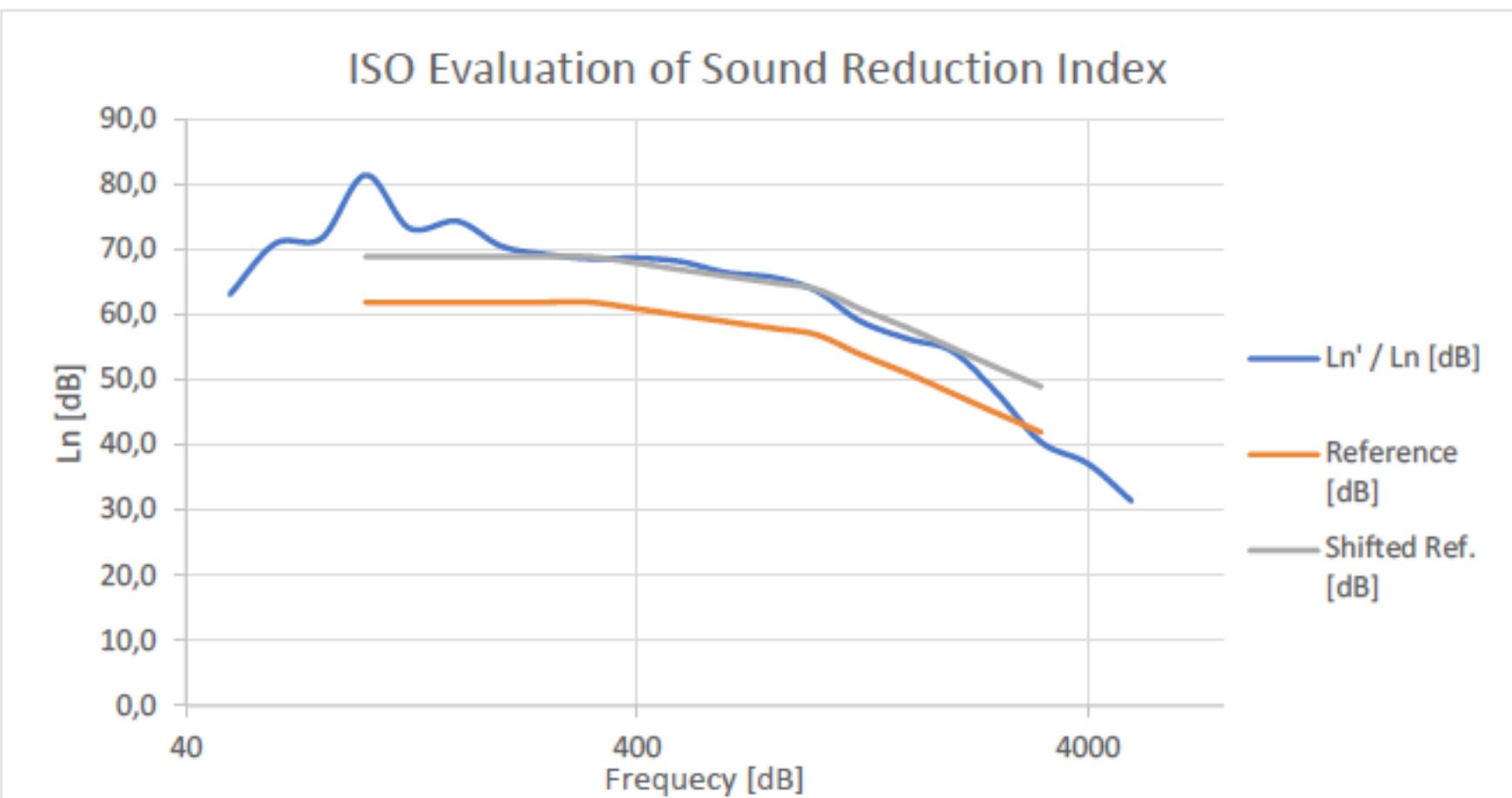


←
Average
Total level:
Nice but
useless

$L_{n,w}$ for a
single number
value



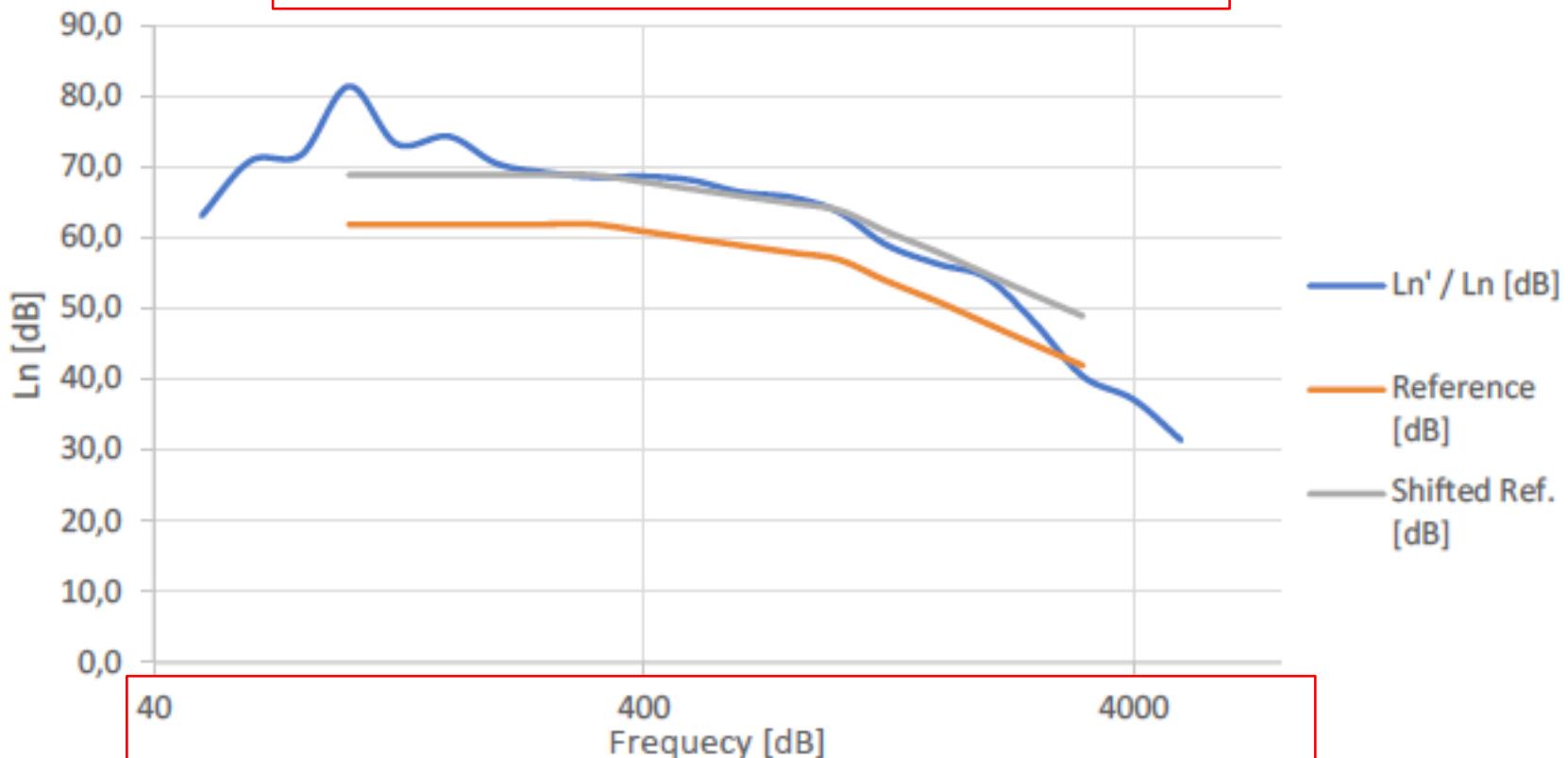
Lab 2 comments



Lab 2 comments

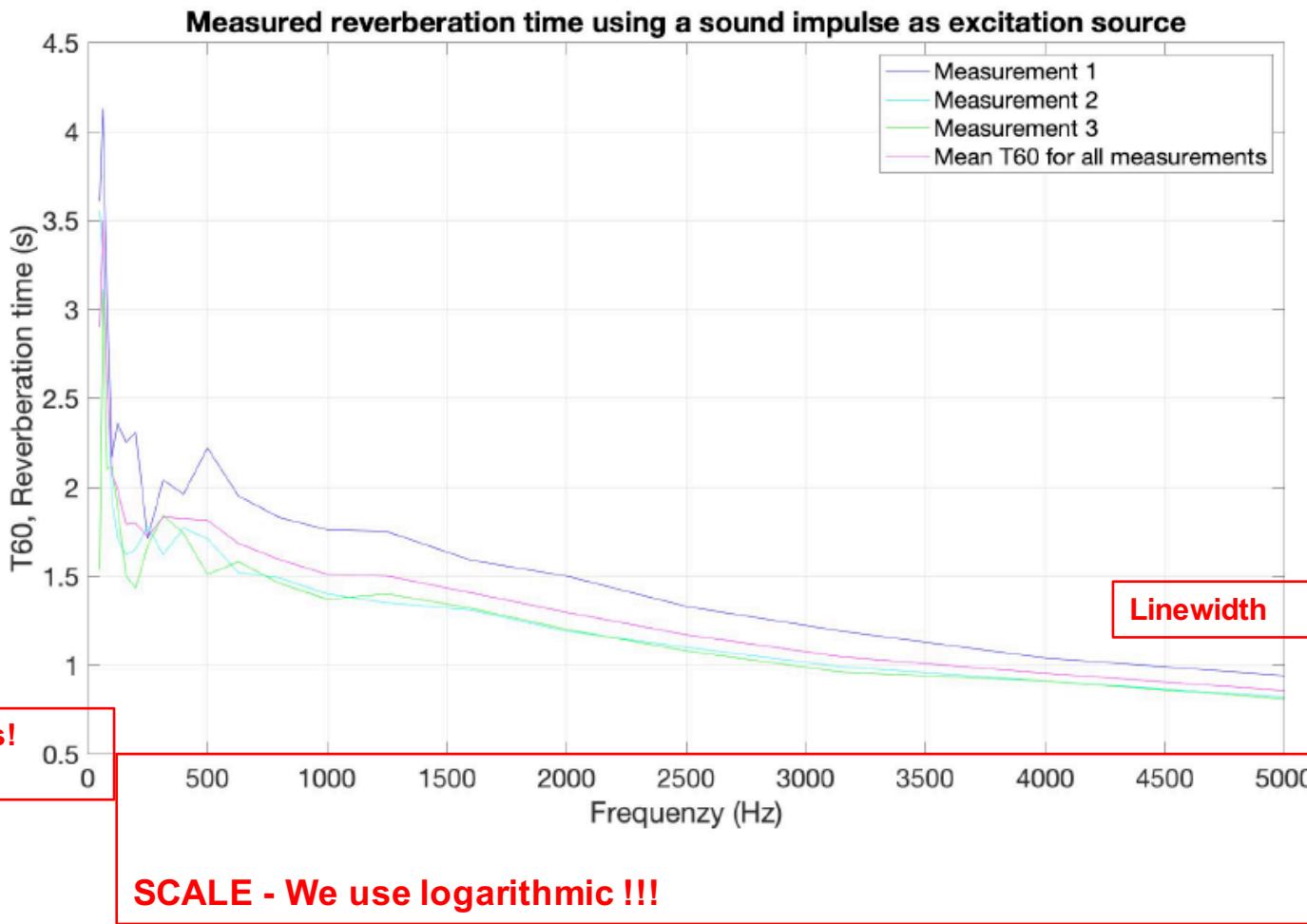
Impact sound pressure levels !!!

ISO Evaluation of Sound Reduction Index



SCALE !!! We use 50 – 5000 Hz

Lab 2 comments



Lab 2 comments

Interesting, not necessary

freq[Hz]	Interrupted Noise						Impulse	
	T60_1	T60_2	T60_3	T60_4	T60_5	T60_6	T60_Books	T60_Handclap
50	463.0877	404.1668	390.9982	414.4005	405.2018	216.5895	393.667146	330.0007933
63	381.2352	306.3038	360.918	344.2877	406.7493	359.173	388.310881	386.1475724
80	411.3571	398.4262	329.3656	404.6846	279.8653	344.8955	373.465447	295.8703551
100	362.6546	279.116	258.0637	356.2457	290.1525	269.1853	356.833074	266.8411297
125	257.2509	258.8739	283.5822	268.4062	300.0872	287.2509	300.087247	276.8559457
160	262.0899	236.9085	278.3647	260.4869	293.0254	265.2668	266.055145	295.8703551
200	236.9085	259.6816	234.2416	252.3191	253.9737	236.9085	258.873921	270.7368267
250	262.8877	236.9085	243.8779	260.4869	263.6831	227.8973	255.617515	245.5893648
315	281.358	276.8559	247.289	280.6126	281.358	257.2509	270.736827	262.0898691
400	254.7969	251.4877	259.6816	279.116	294.4513	278.3647	271.509259	276.8559457
500	238.67	251.4877	248.1344	279.116	279.116	271.5093	280.612643	265.266832
630	252.3191	238.67	251.4877	274.5773	260.4869	253.9737	272.279499	254.7969112
800	248.1344	243.0177	248.977	260.4869	269.9622	248.977	262.089869	248.9769644
1000	239.5458	239.5458	245.5894	269.1853	258.0637	248.977	263.683135	236.908536
1250	236.9085	243.8779	240.4185	266.0551	246.4406	236.9085	262.089869	238.6699621
1600	232.4466	236.9085	230.6376	258.0637	244.7351	242.1544	249.816687	228.814381
2000	230.6376	219.471	212.6866	248.977	233.3458	234.2416	239.545818	225.1235844
2500	221.3713	216.5895	217.5542	225.1236	228.8144	224.1914	229.727815	216.5894613
3150	205.6785	209.7118	212.6866	216.5895	209.7118	201.5646	213.66902	206.6942503
4000	197.3648	206.6943	200.5229	195.2311	193.0738	191.986	199.475753	194.1554405
5000	189.7918	188.6852	190.8921	188.6852	180.7489	187.572	191.986038	183.0515048

Figure 5: Cut off frequencies for each position and third octave band. Green is valid and red is invalid

What frequencies?? Schroeder

Lab 2 comments

6 References

1. How to write a technical report

http://www.akustik.lth.se/fileadmin/tekniskakustik/education/2019_VTAN01/HowToWriteReports_VTAN01_2019.pdf

2. Laboratory instructions

http://www.akustik.lth.se/fileadmin/tekniskakustik/education/2020_VTAN01/Lab2_VTAN01_Instructions_2020.pdf

3. ISO 717.2 standard

http://www.akustik.lth.se/fileadmin/tekniskakustik/education/2020_VTAF01/SS_EN_ISO_717_2_2013_EN.pdf

4. Vigran, Tor Erik. Building Acoustics. 2008

**References always written with a system!
Do not put just links
Include publisher**

References

- [1] Lab 2 - Measurement of impact sound insulation. Course: Acoustics (VTAN01). HT2 2020/2021. Lund University, Engineering Acoustics at LTH.
- [2] Acoustics - Measurement of room acoustic parameters - Part 2: Reverberation time in ordinary rooms (ISO3382-2:2008), edition 1. Svenska institutet för standarde. Published 2008-09-01.
- [3] Acoustics - Field measurement of sound insulation in buildings and of building elements - Part 2: Impact sound insulation (ISO16283-2:2018), edition 2. Svenska institutet för standarde. Approved 2018-08-15.
- [4] Acoustics - Rating of sound insulation in buildings and of building elements - Part 2: Impact sound insulation (ISO717-2:2013). Svenska institutet för standarde. Approved 2013-03-13.

!!! This is ISO – International Standardization Organization...

Lab 2 comments

> Reference system

Hveem S., Homb A., Hagberg K., Rindel J. H., Low-frequency Footfall Noise in Multistorey Timber Frame Buildings. NKB Committee and Work Reports 1996:12 E, NKB Nordic Committee on building Regulations, Monila Oy, Helsinki (1997).

ISO 12913-1:2014 “Acoustics – Soundscape – Part 1: Definition and conceptual framework.”, International Organization for Standardization, Geneva, Switzerland, (2014).



Thank you for your attention!

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