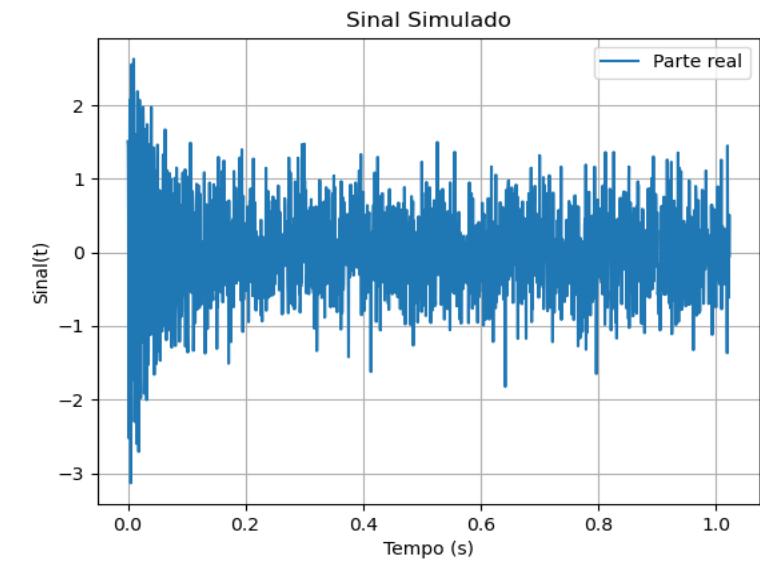
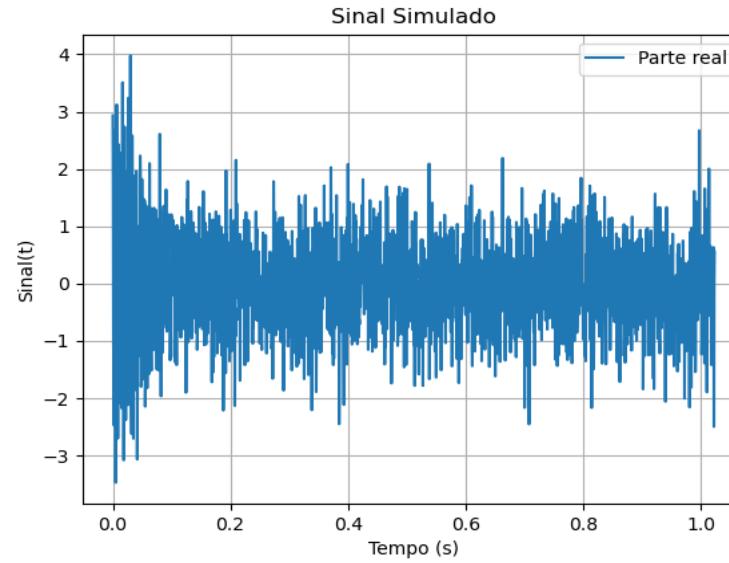
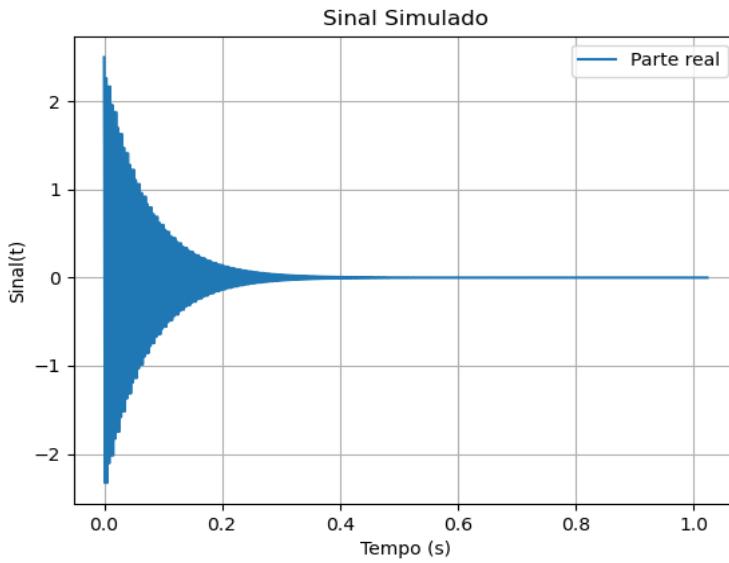


Análise dos efeitos de filtragem por Transformada Wavelet 1D

Thiago Oliveira dos Santos - n°USP 13696220



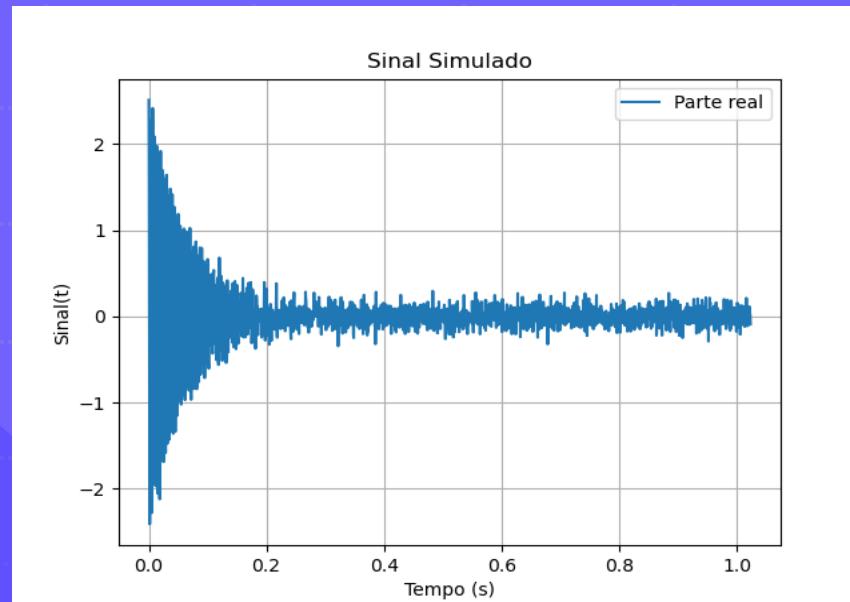
Sinal simulado com
frequência única de 300 Hz

Sinal corrompido com
desvio padrão de 0.75

Sinal corrompido com
desvio padrão de 0.5

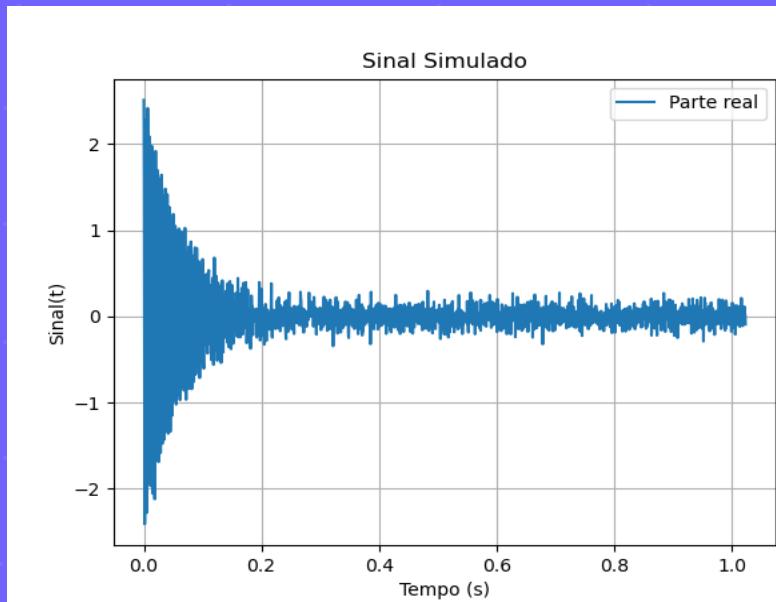
Sinal corrompido
com desvio
padrão de 0.1

Sinal A



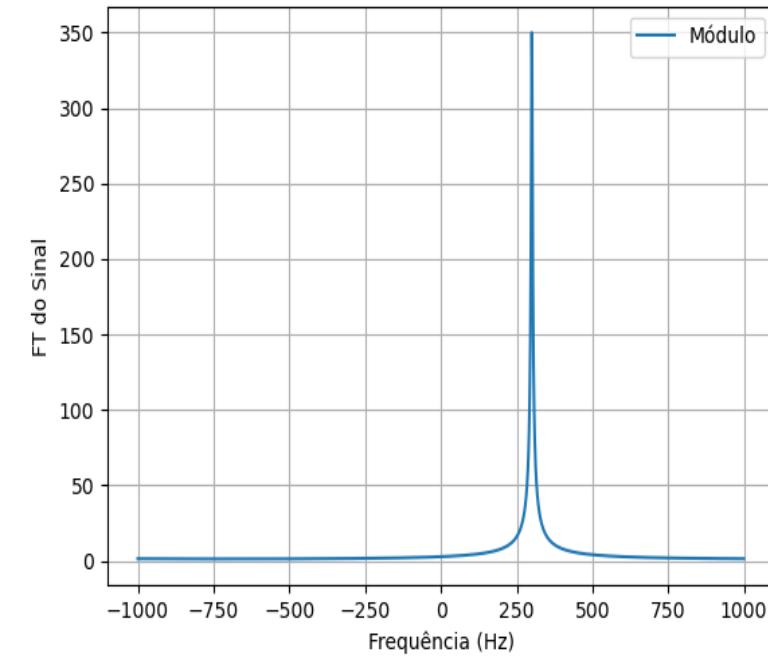
Sinal corrompido
com desvio
padrão de 0.05

Sinal B



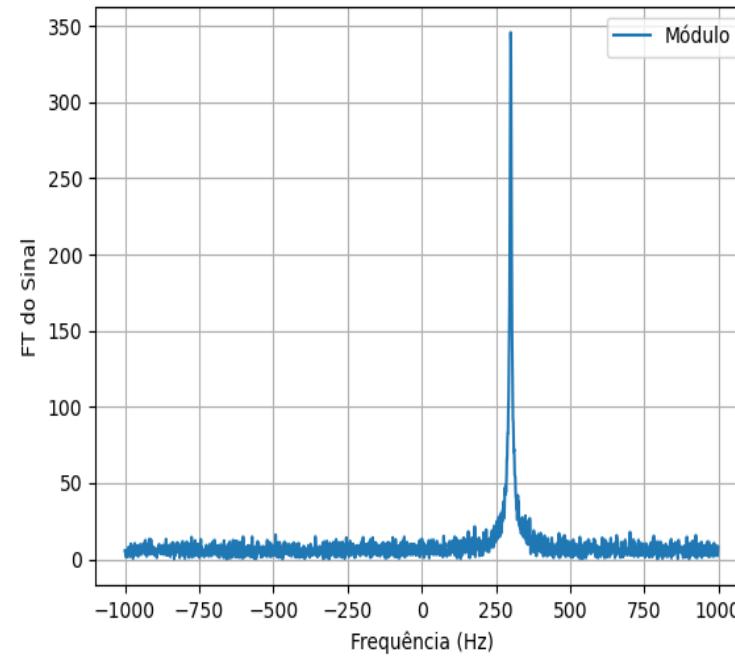
Transformada de Fourier

Espectro de Frequência do Sinal



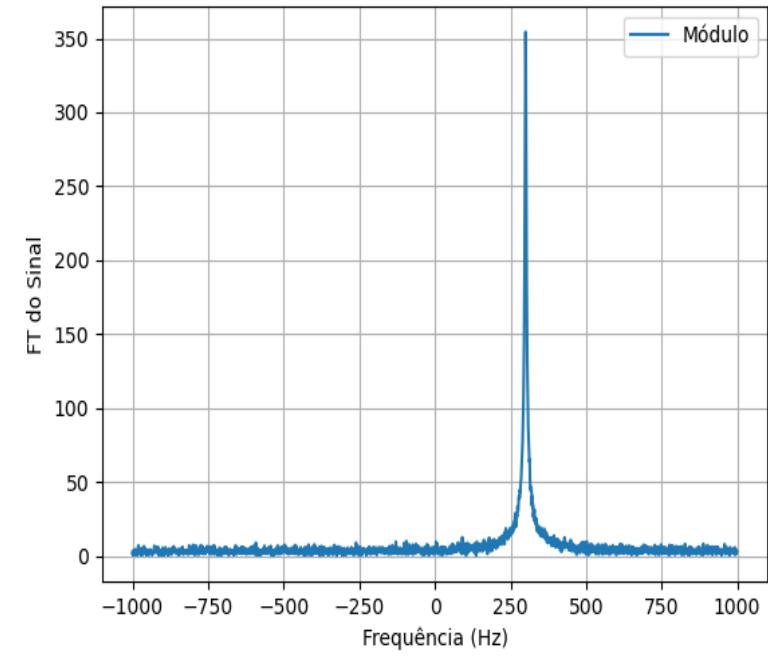
FT do sinal original

Espectro de Frequência do Sinal



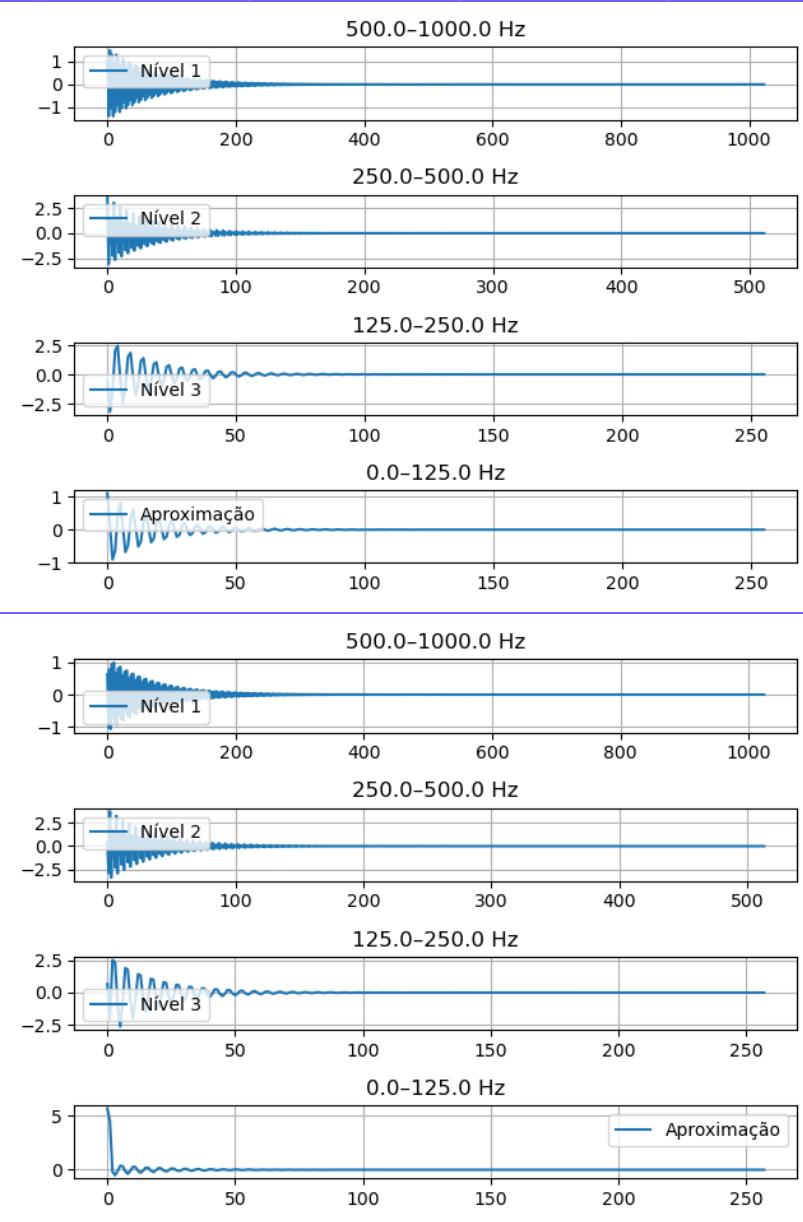
FT do sinal A

Espectro de Frequência do Sinal

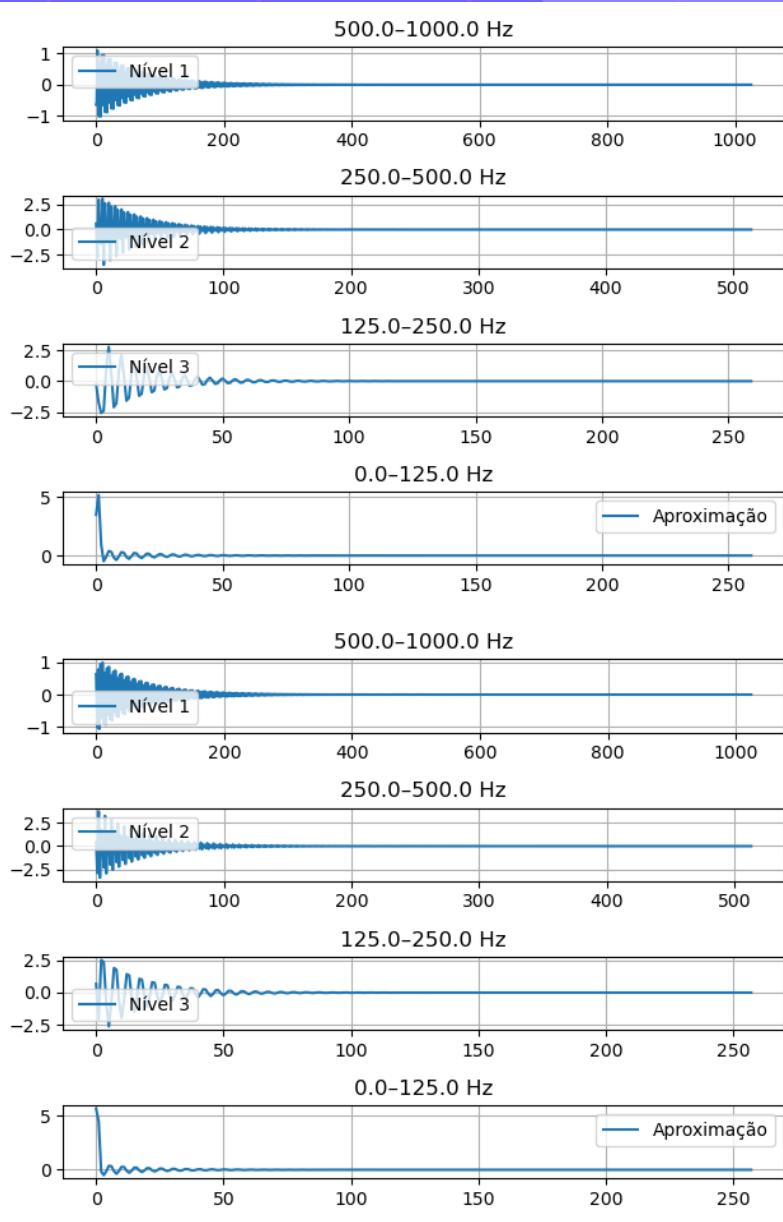


FT do sinal B

Transformada Wavelet do Sinal Original

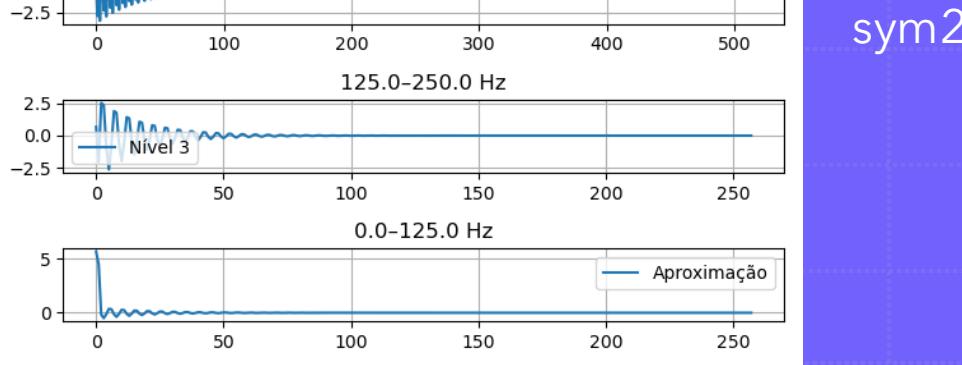


haar



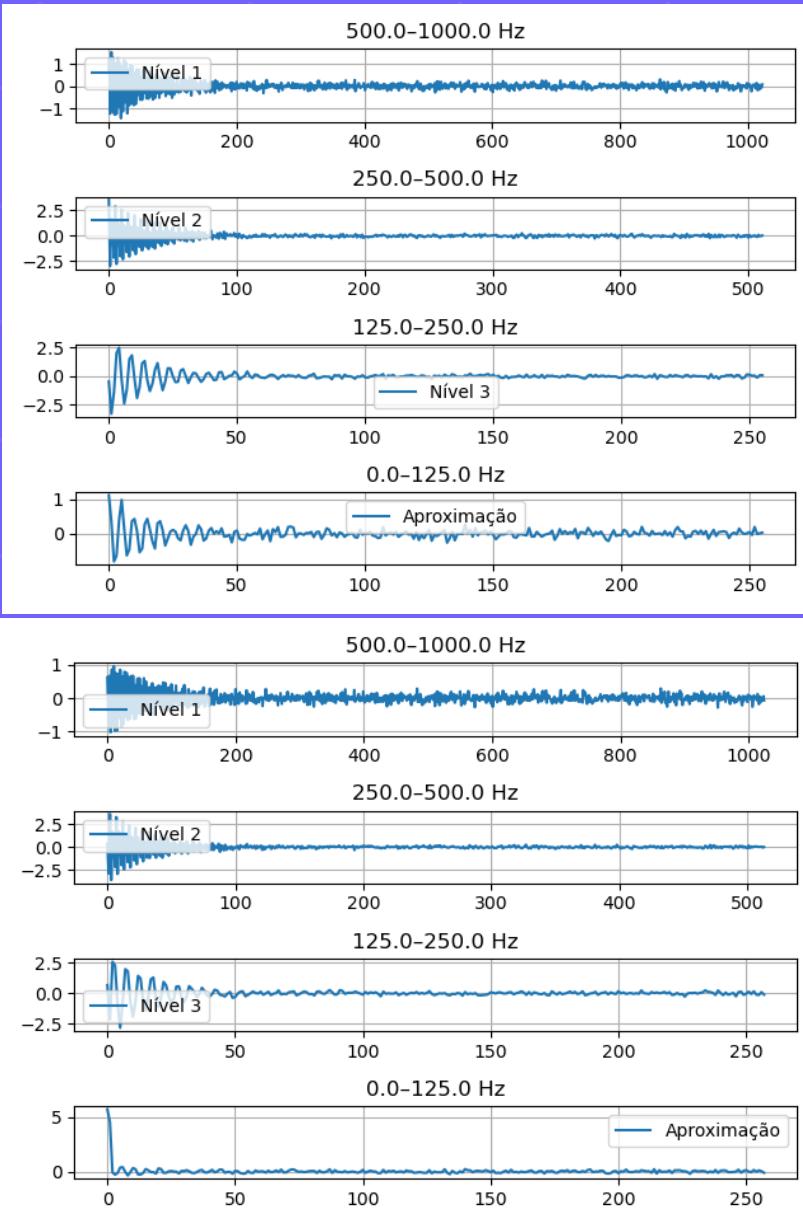
coif1

db2

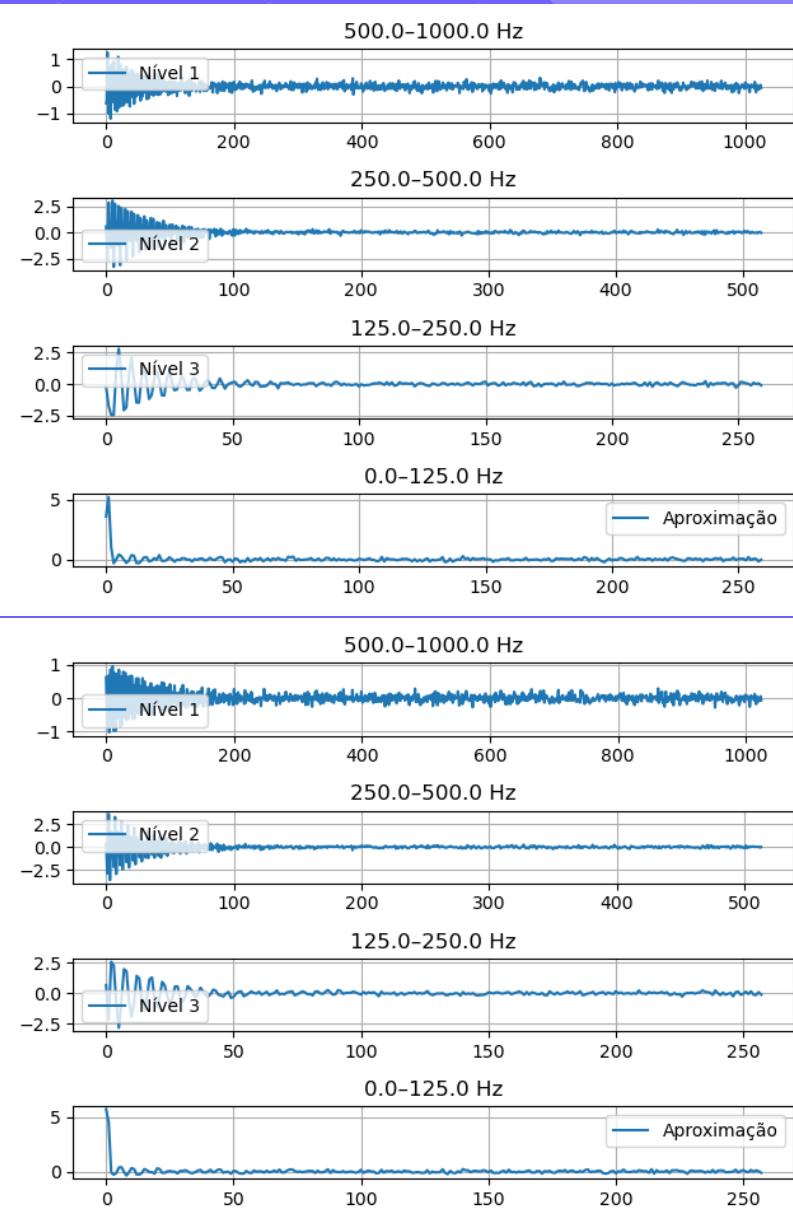


sym2

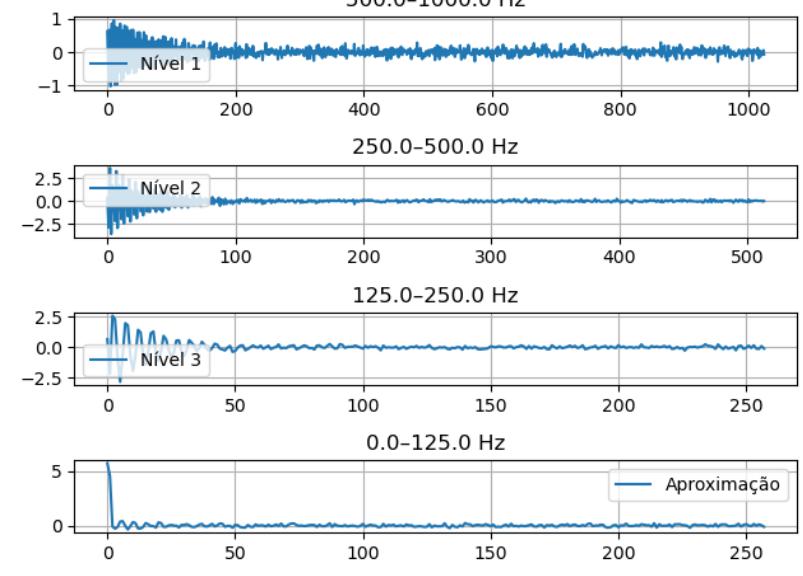
Transformada Wavelet do Sinal A



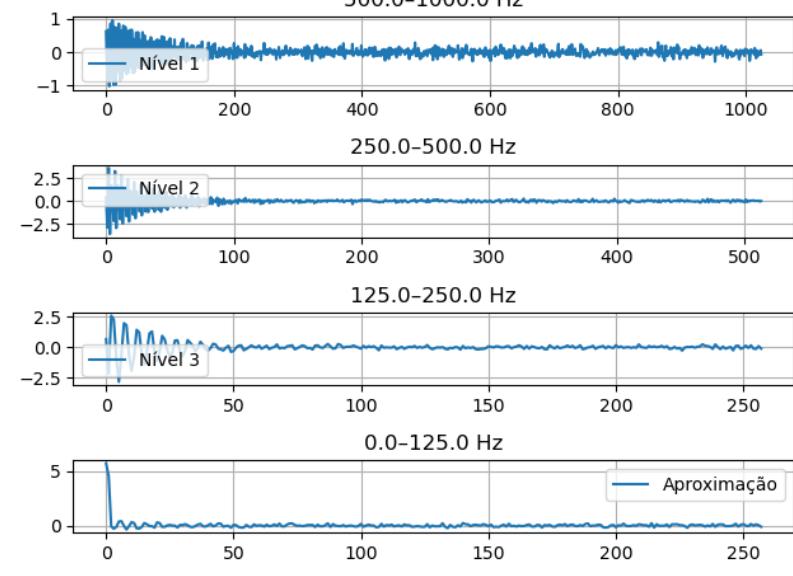
haar



coif1

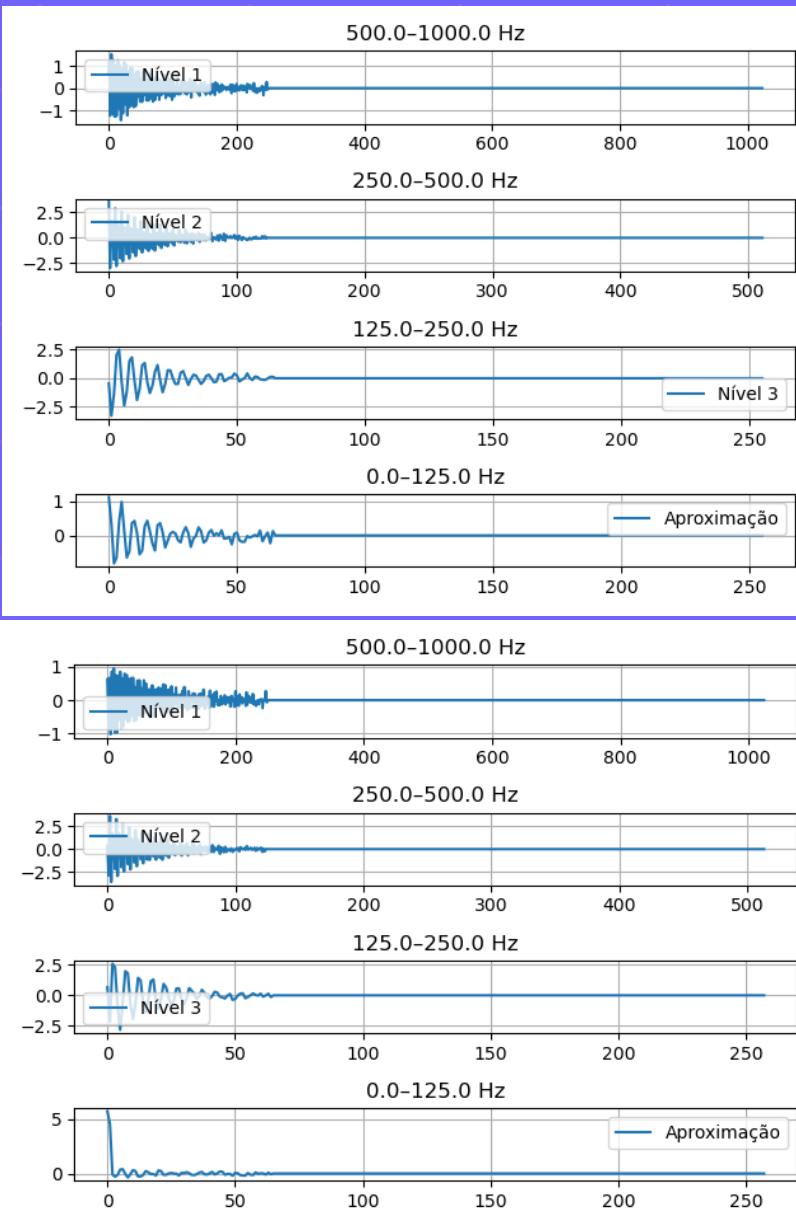


db2

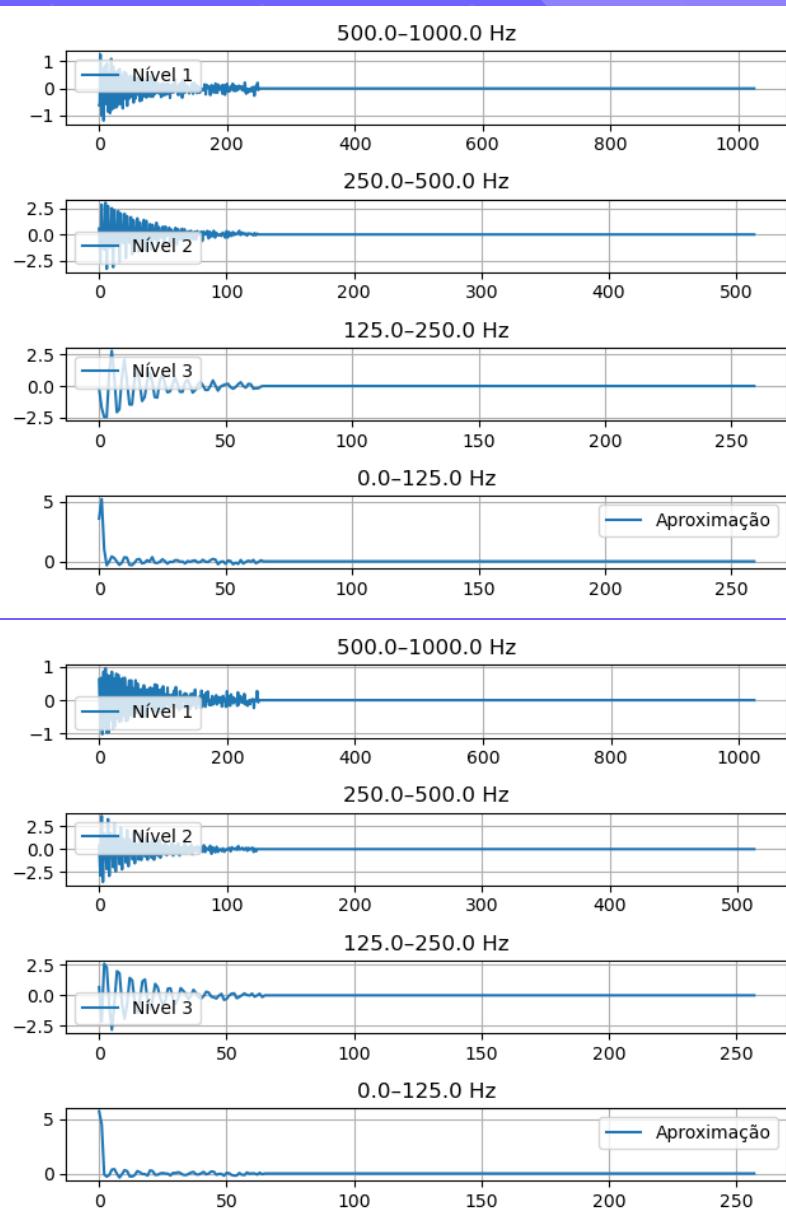


sym2

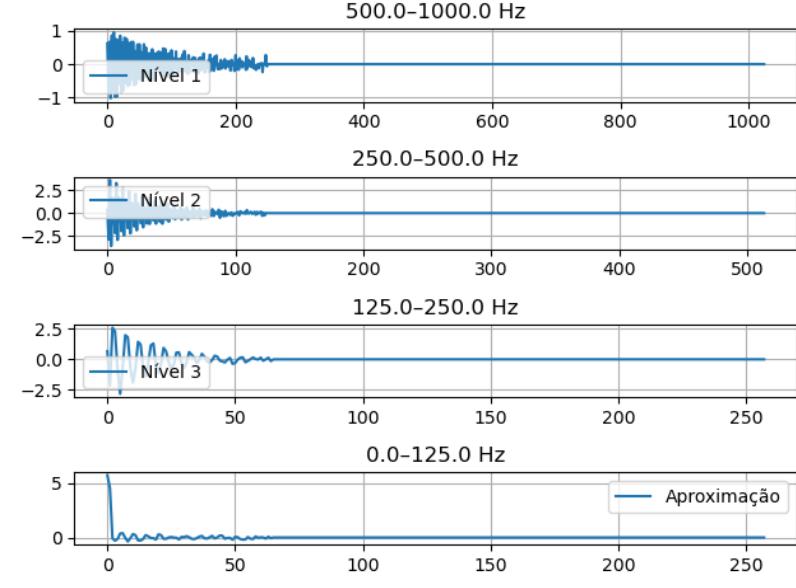
Filtragem da WT do Sinal A



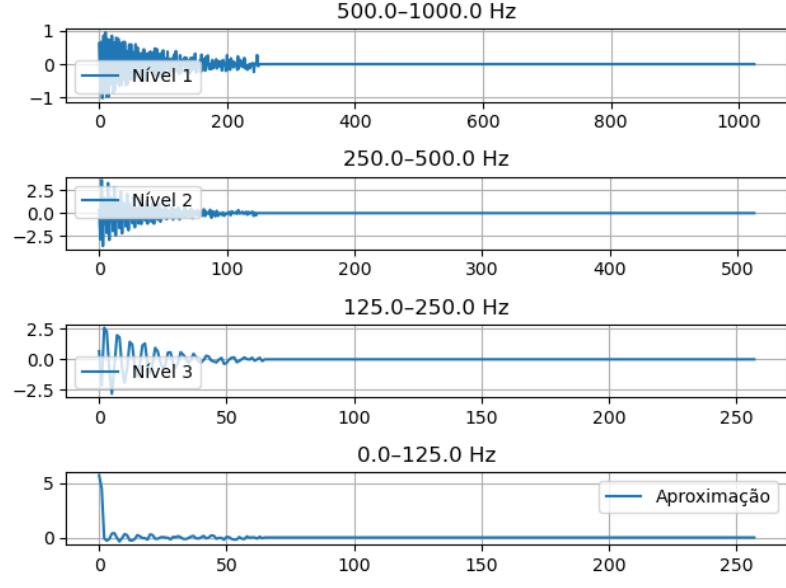
haar



coif1

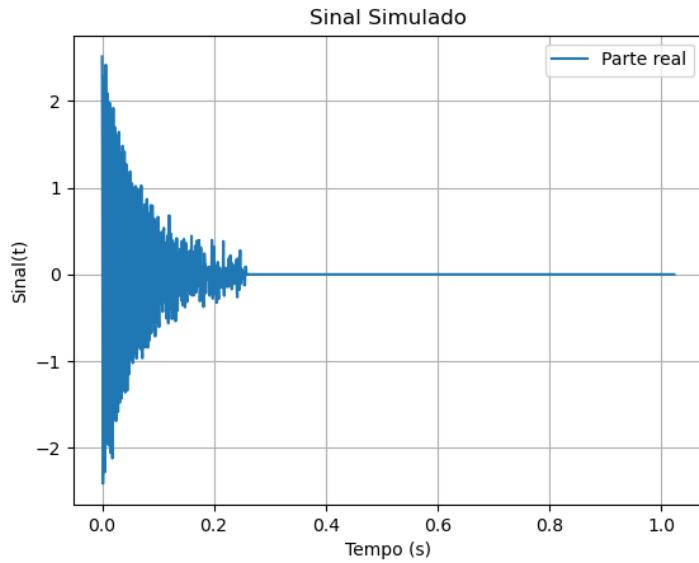


db2

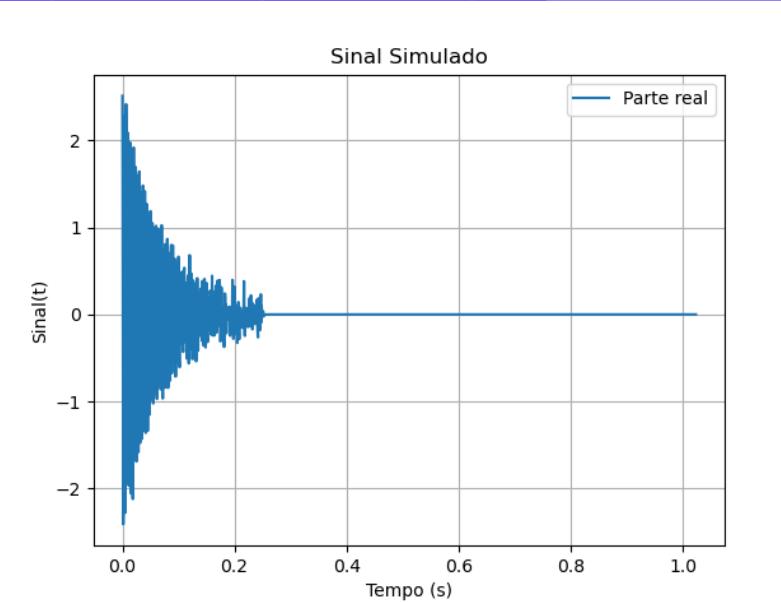


sym2

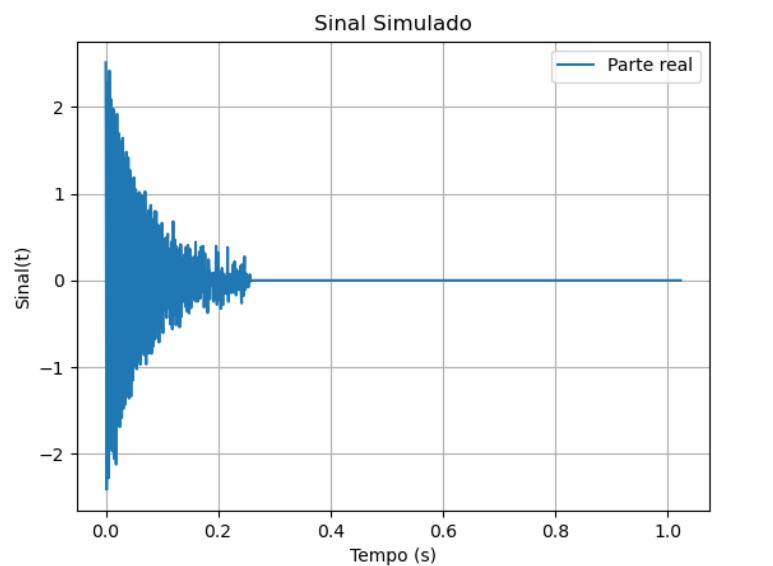
IDTWT do Sinal A filtrado



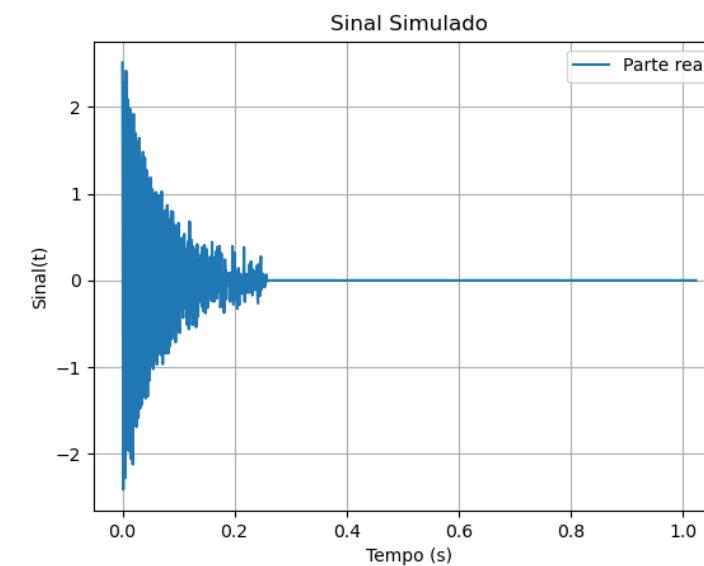
haar



coif1

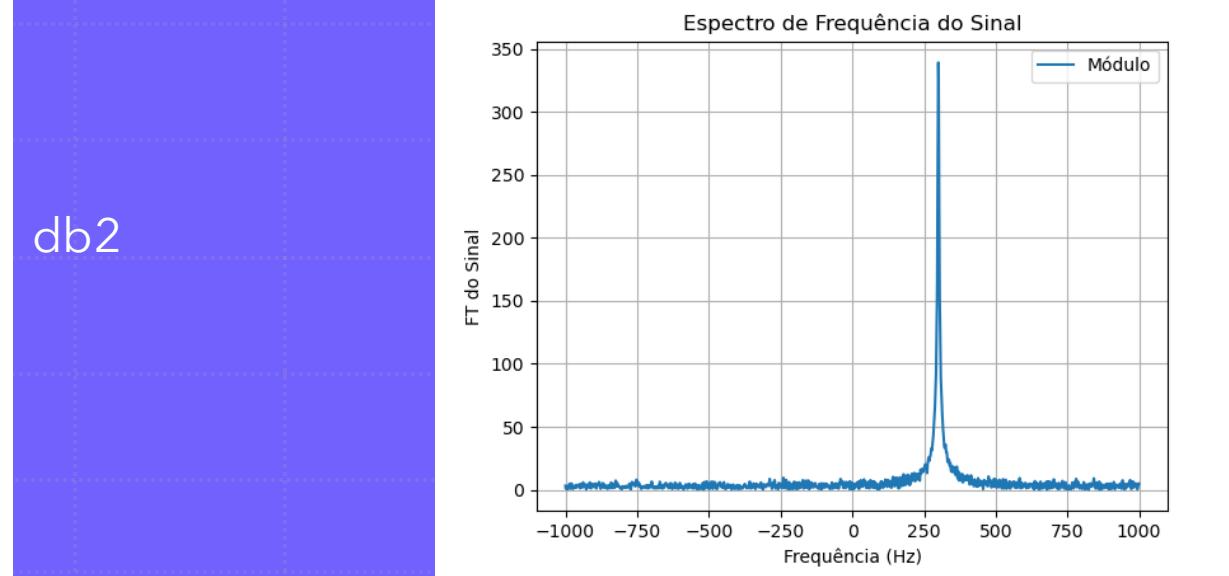
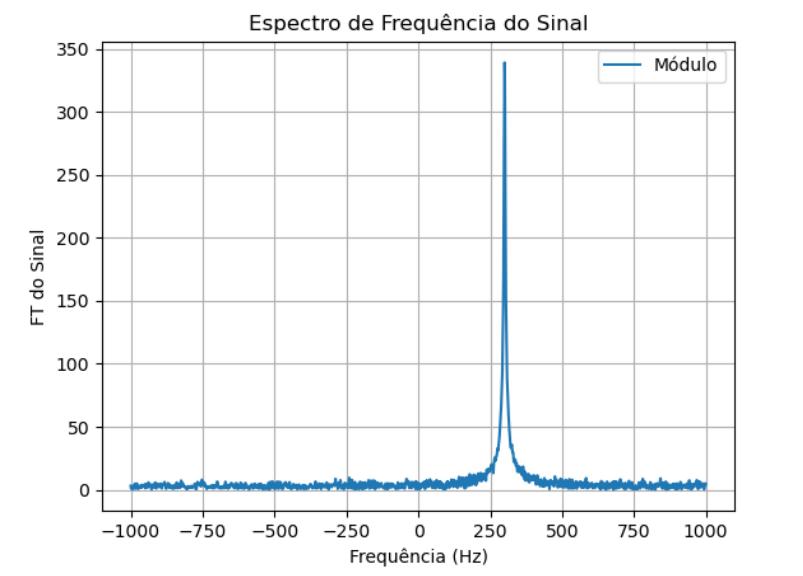
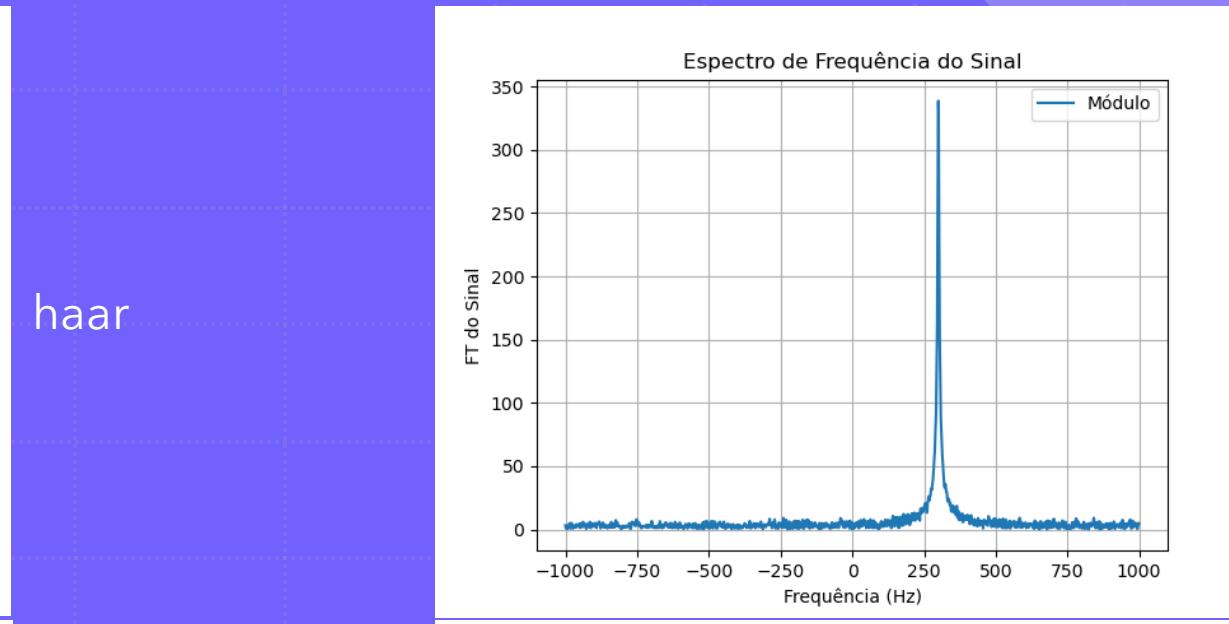
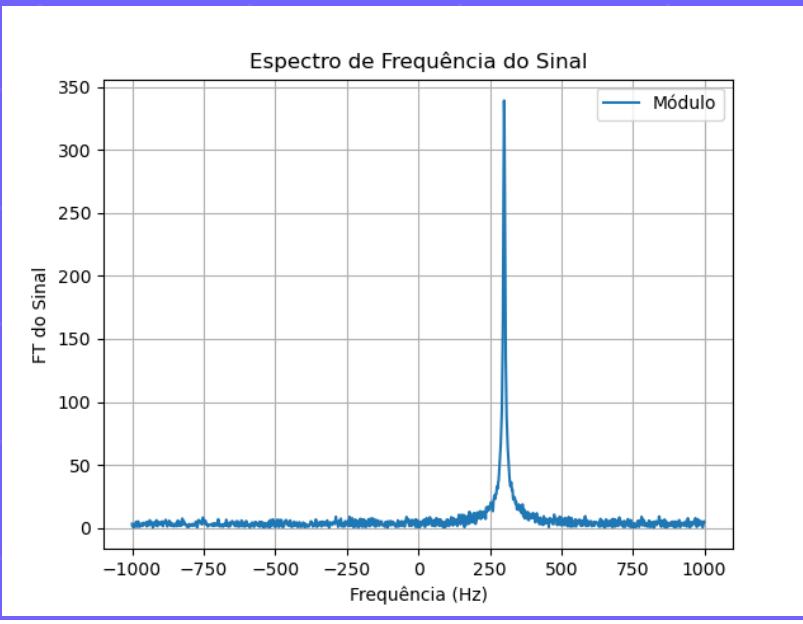


db2



sym2

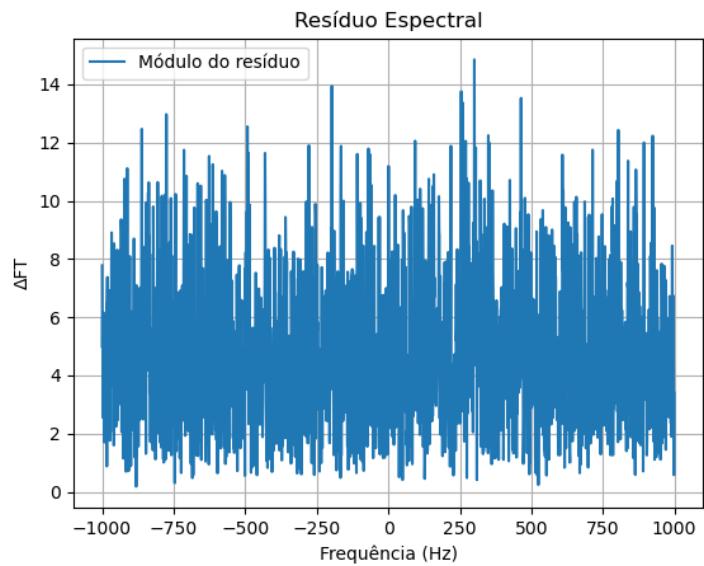
FT do Sinal A filtrado



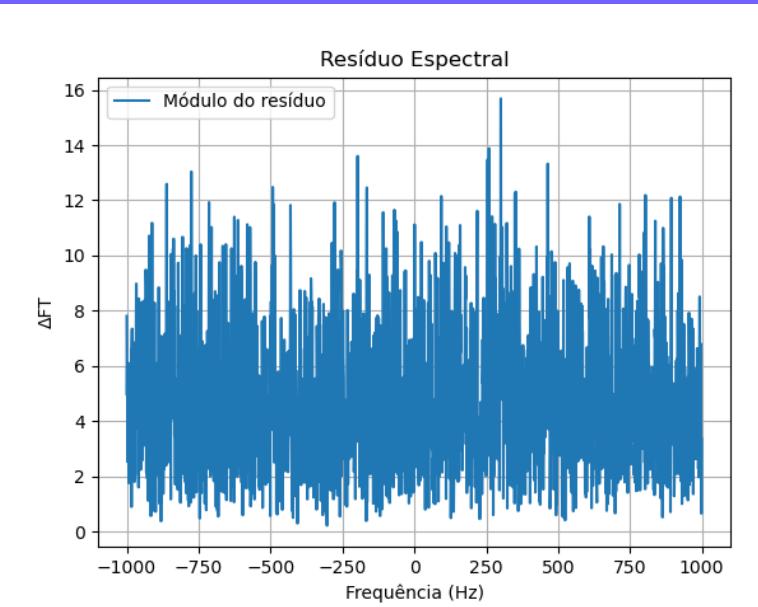
coif1

sym2

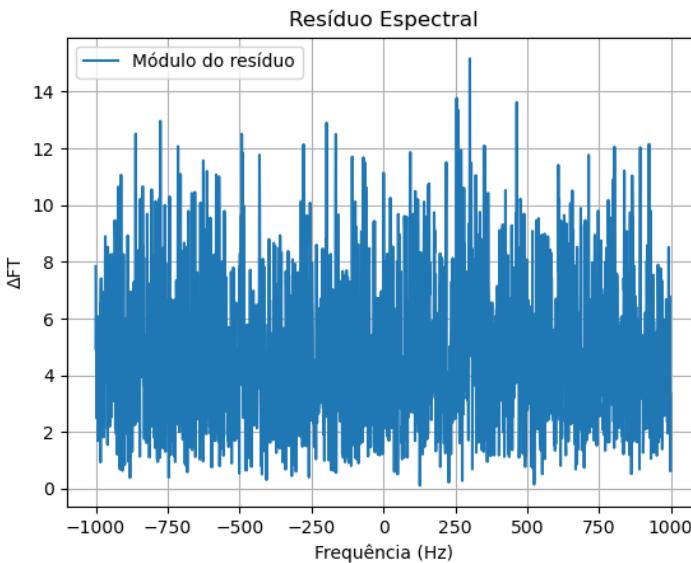
Resíduo do Sinal A filtrado



haar

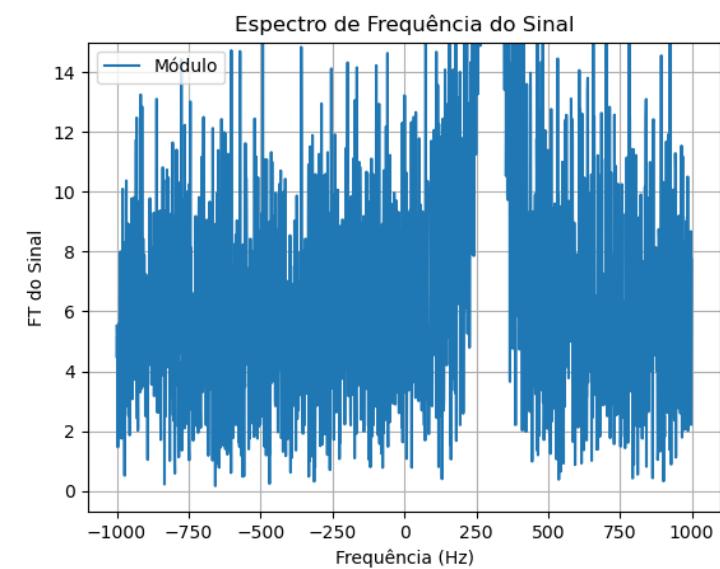


db2



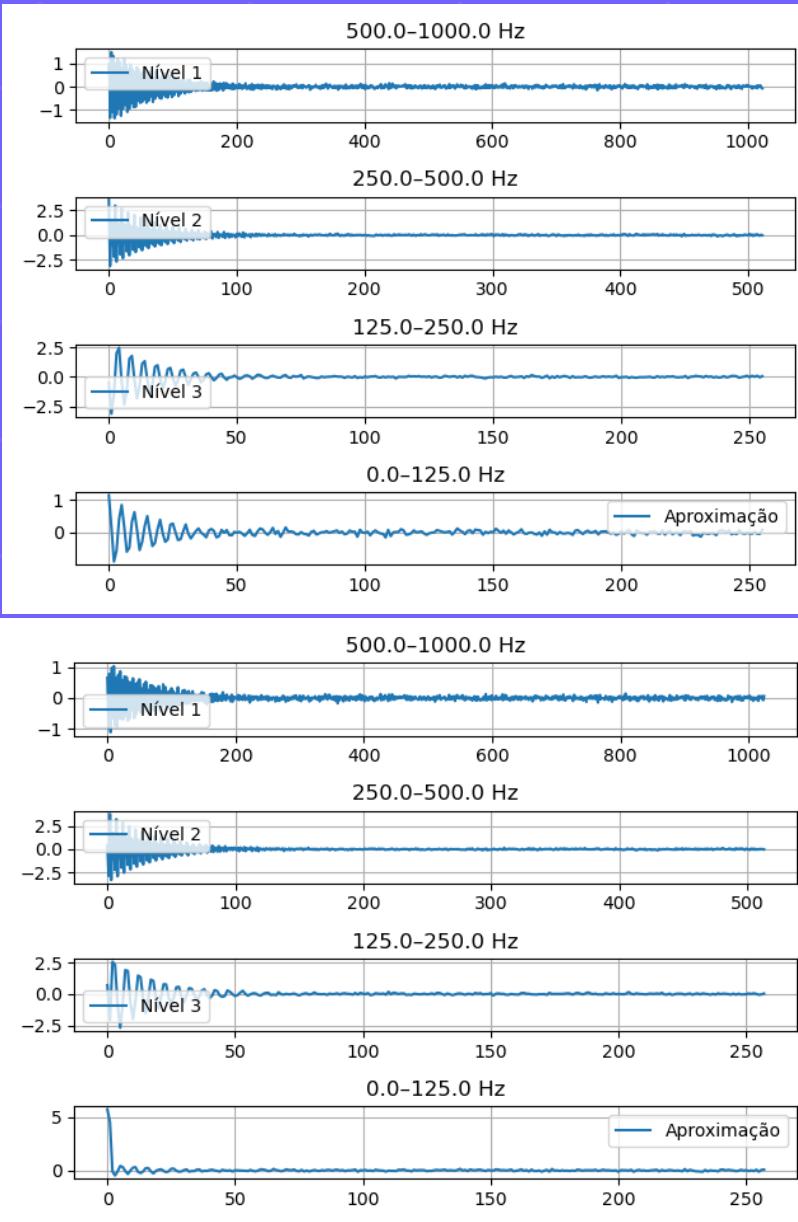
coif1

zoom FT(Sinal A)

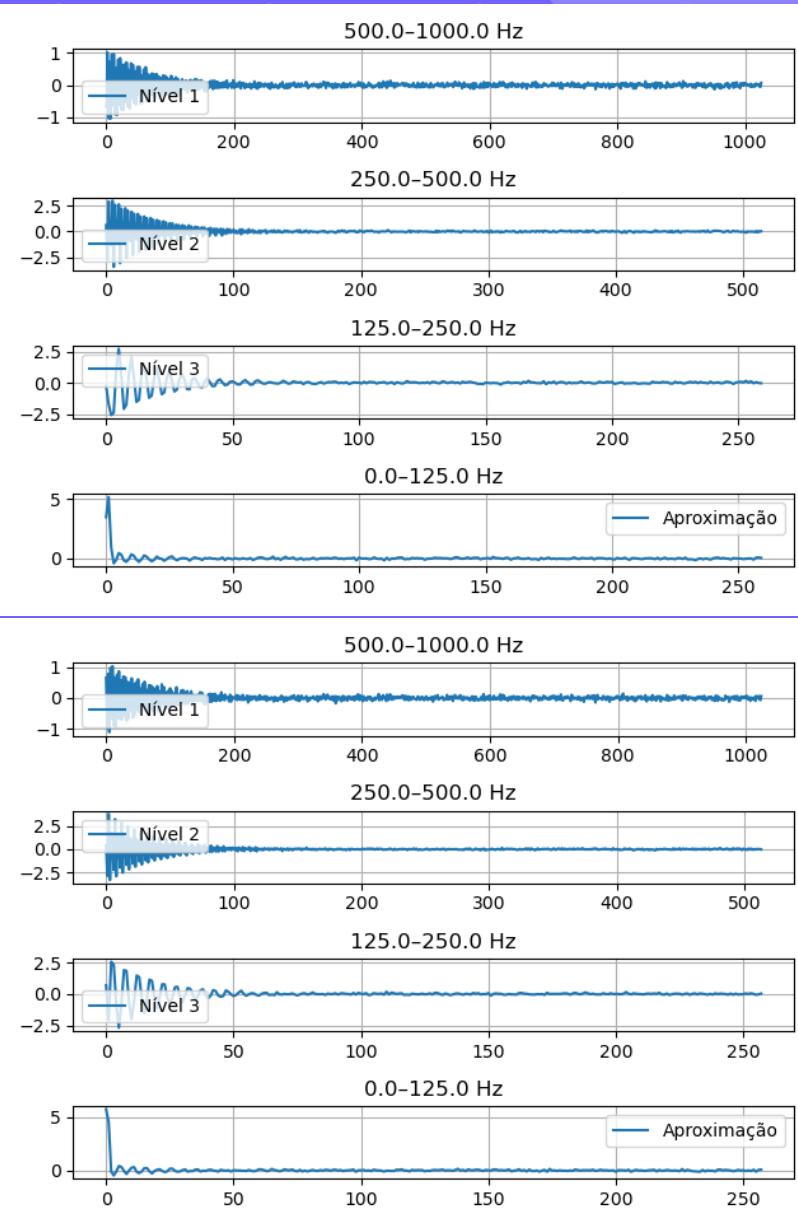


sym2

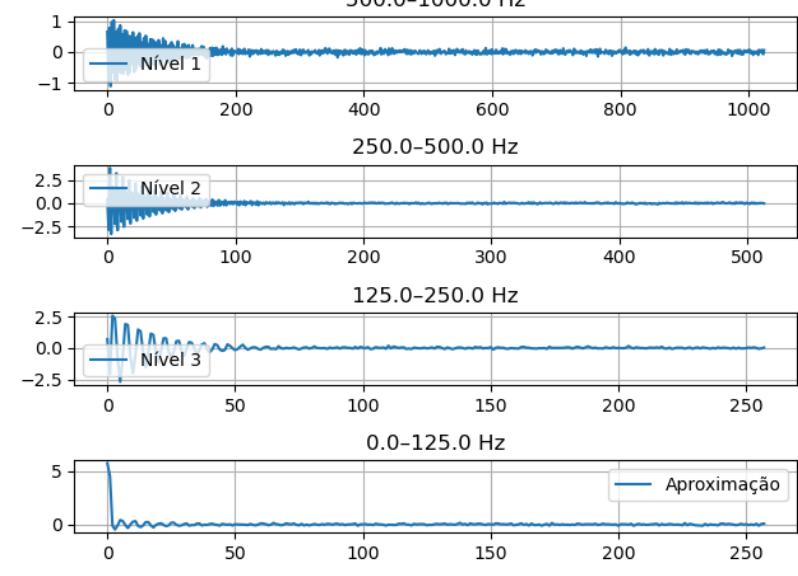
Transformada Wavelet do Sinal B



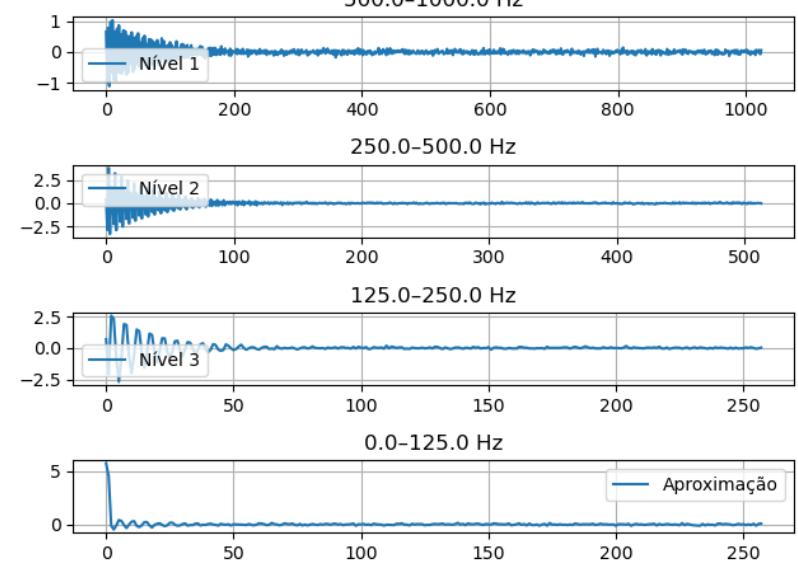
haar



coif1

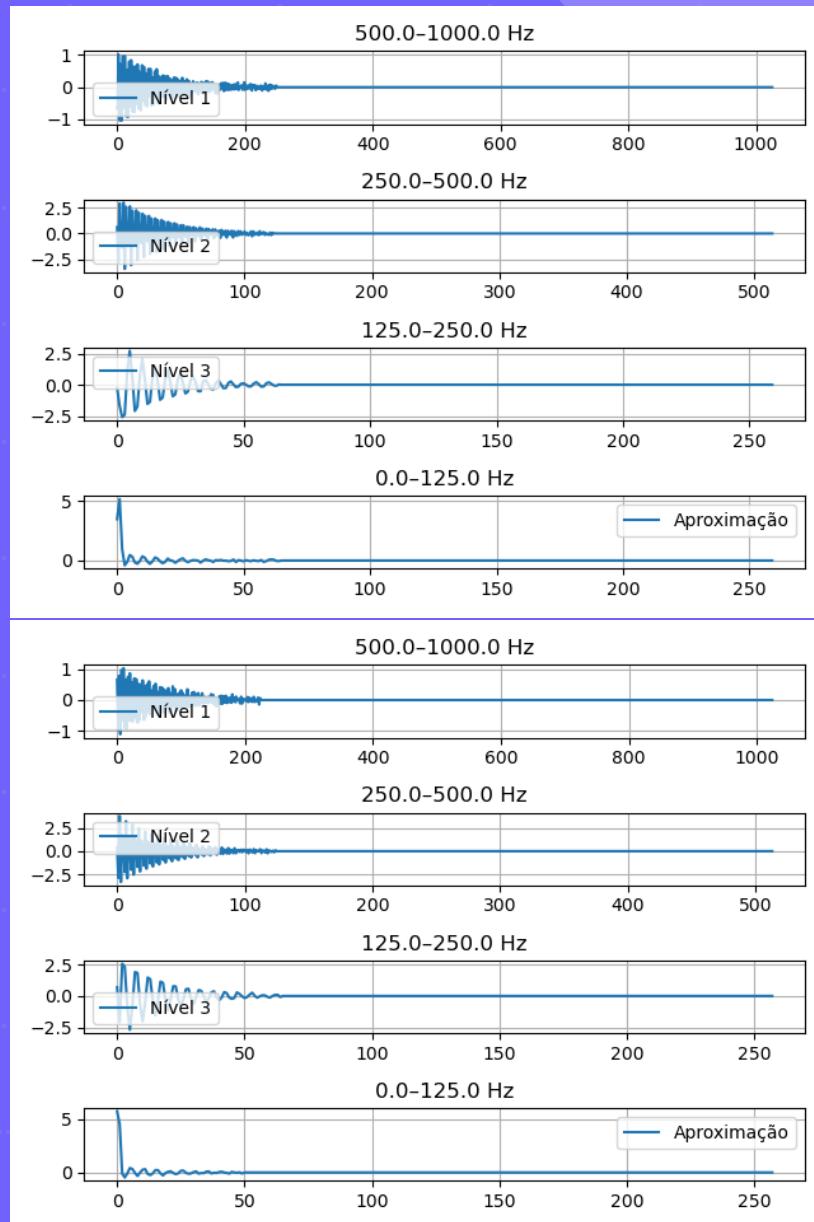
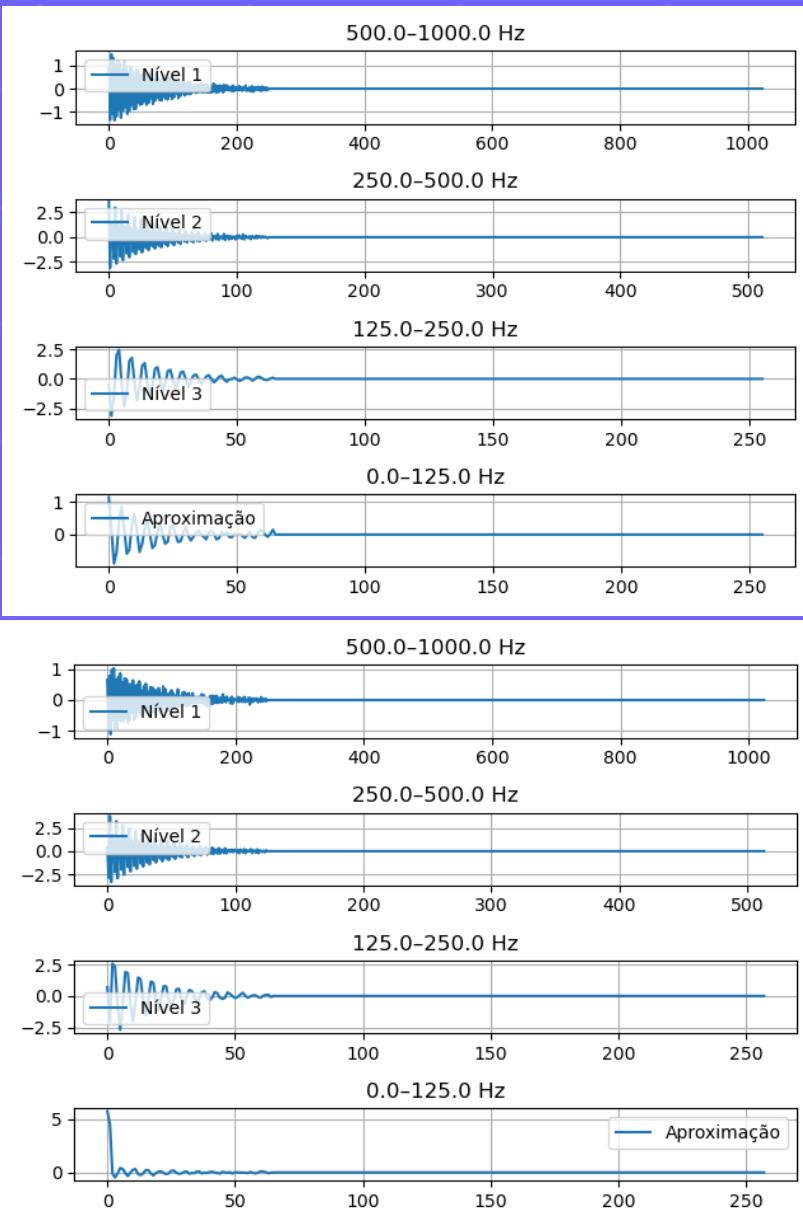


db2



sym2

Filtragem da WT do Sinal B



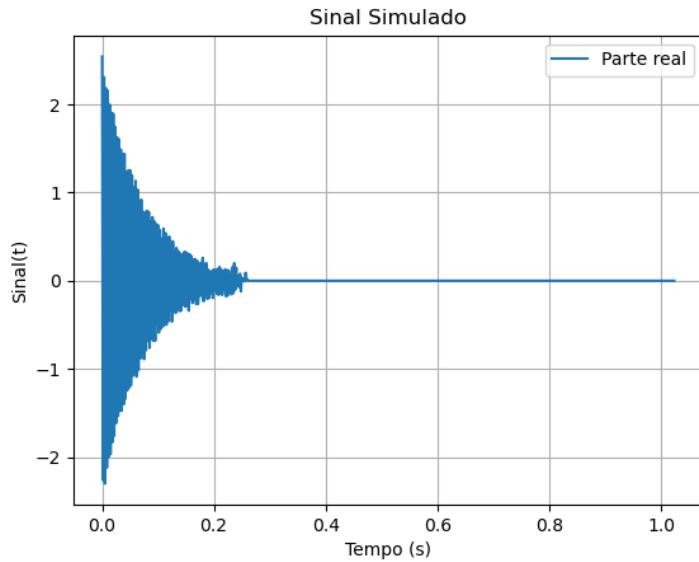
haar

coif1

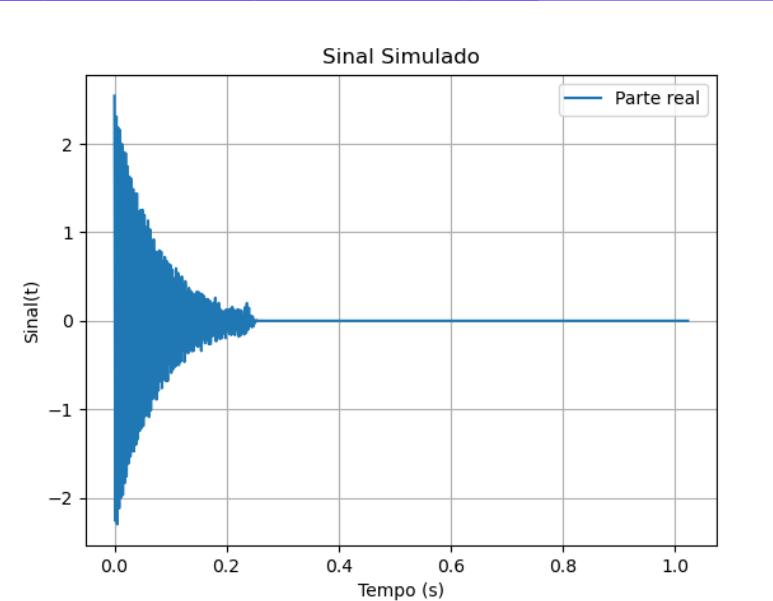
db2

sym2

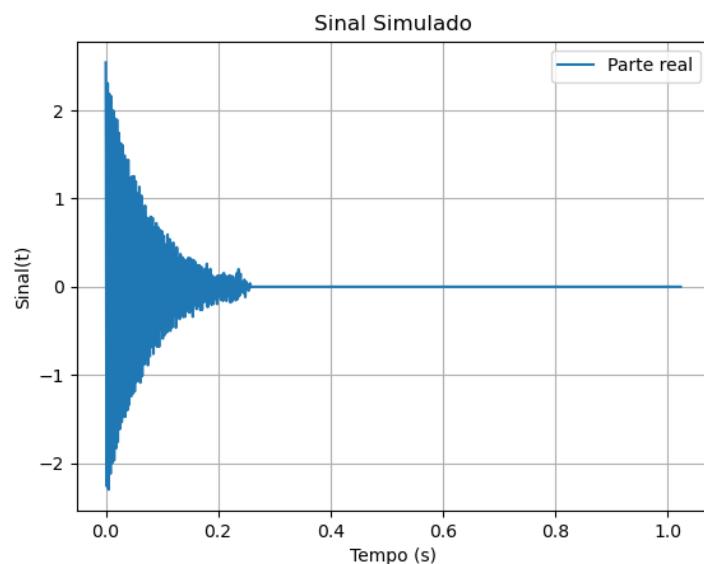
IDTWT do Sinal B filtrado



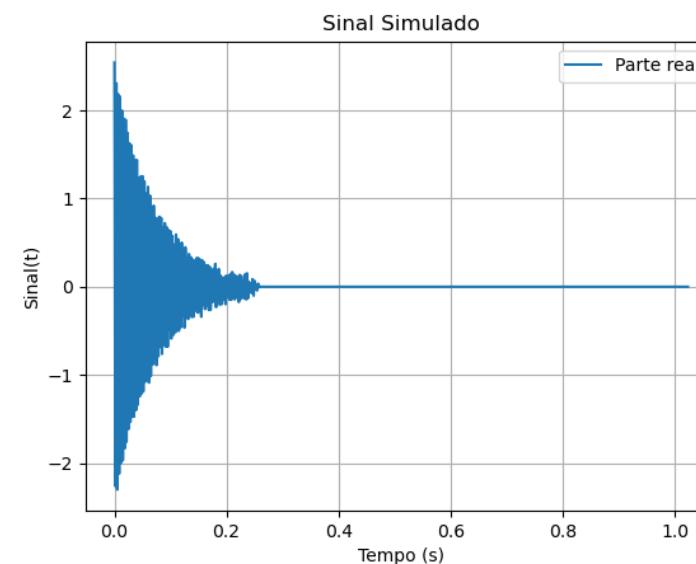
haar



coif1

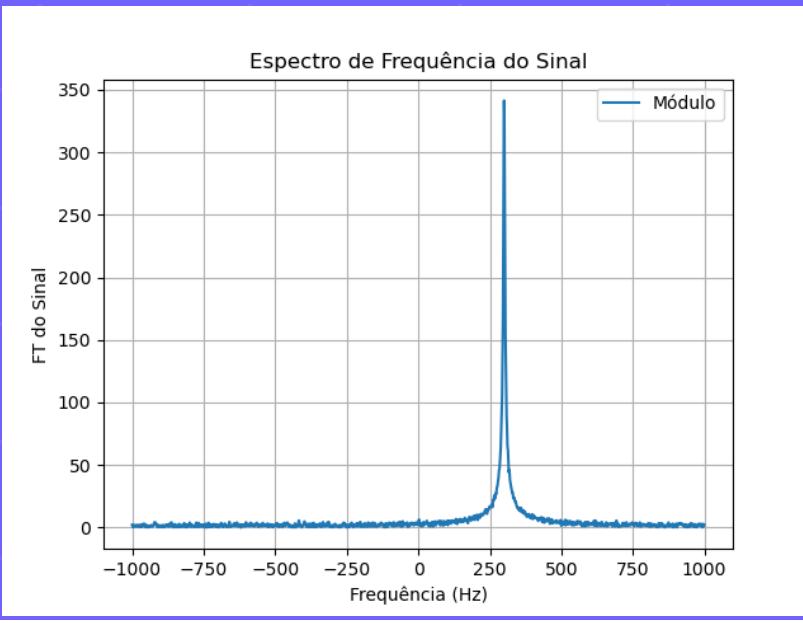


db2

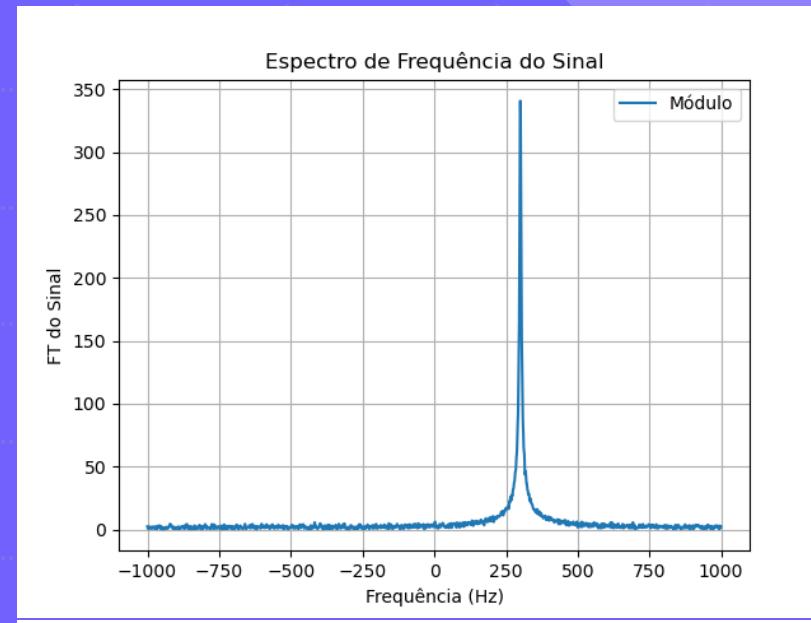


sym2

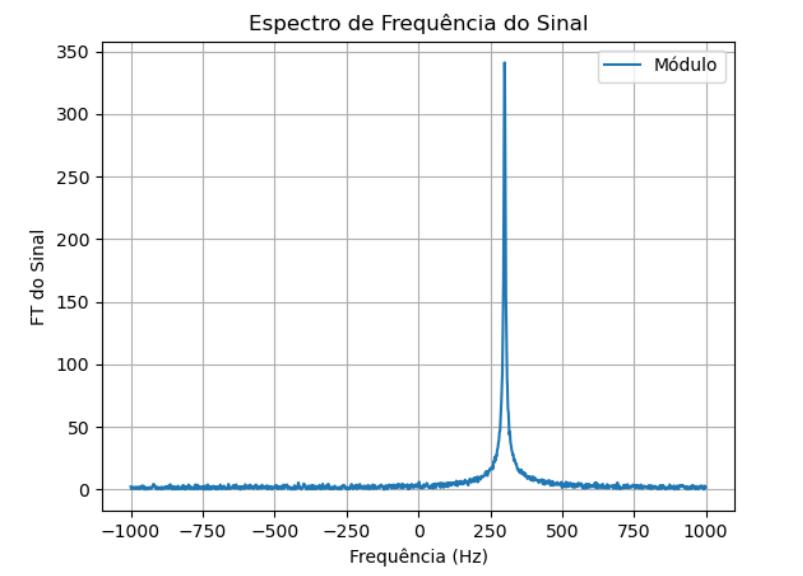
FT do Sinal B filtrado



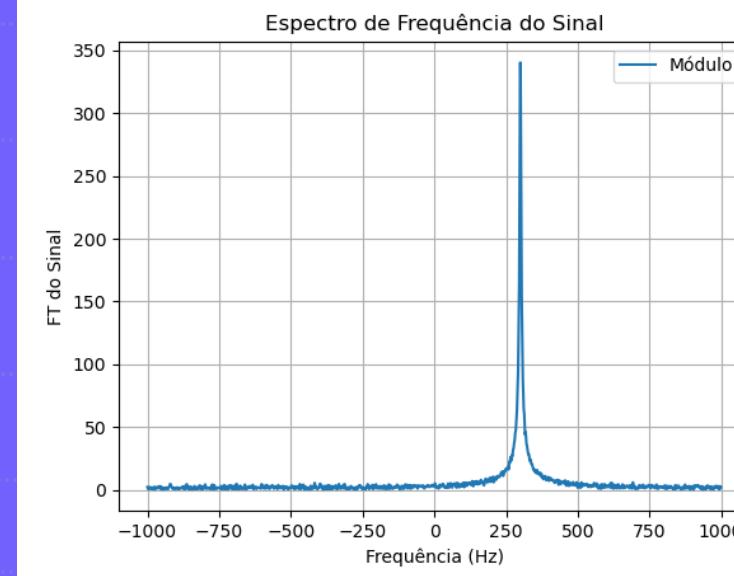
haar



coif1

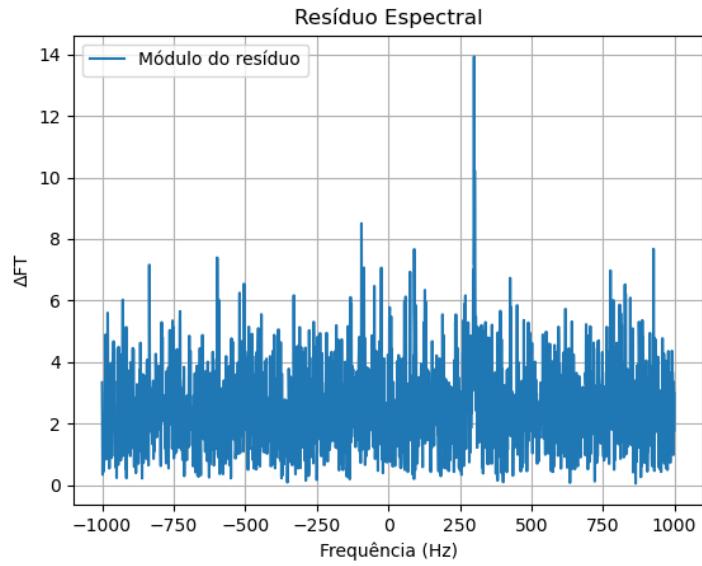


db2

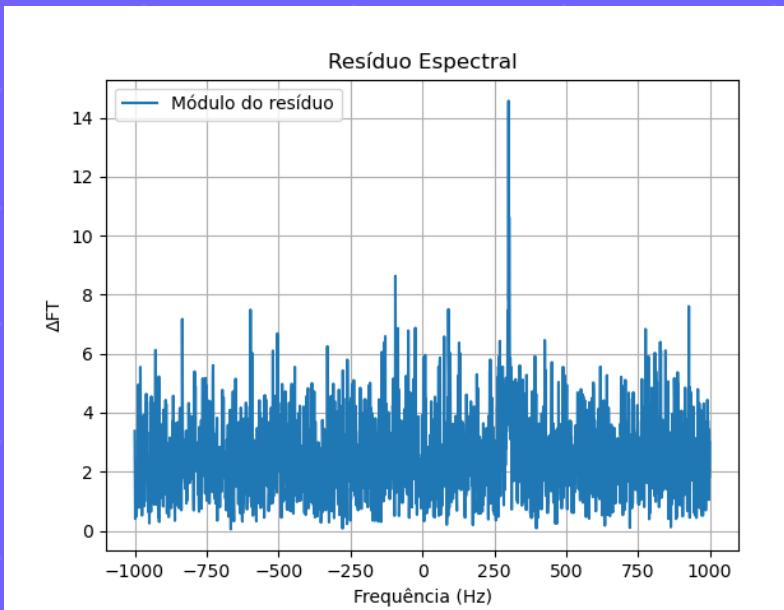


sym2

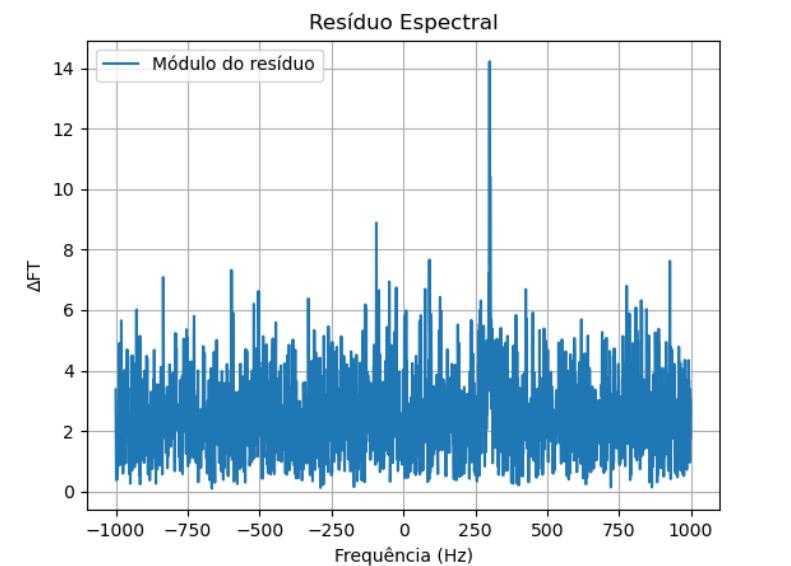
Resíduo do Sinal B filtrado



haar

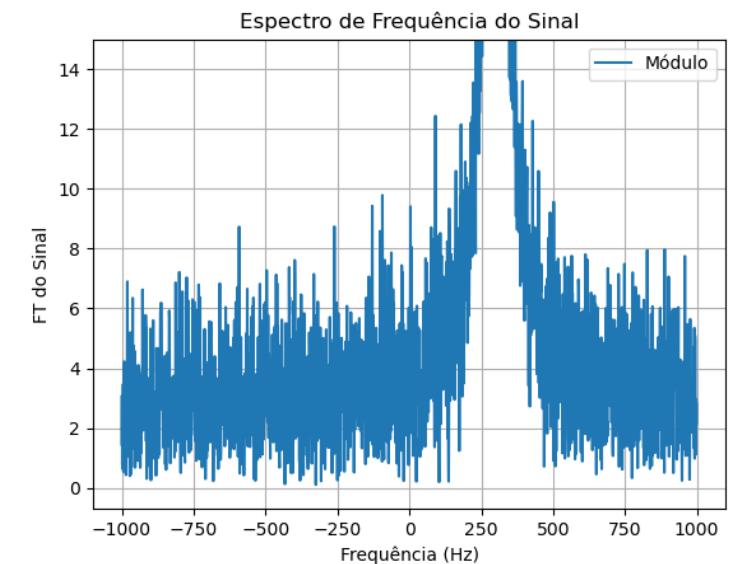


db2



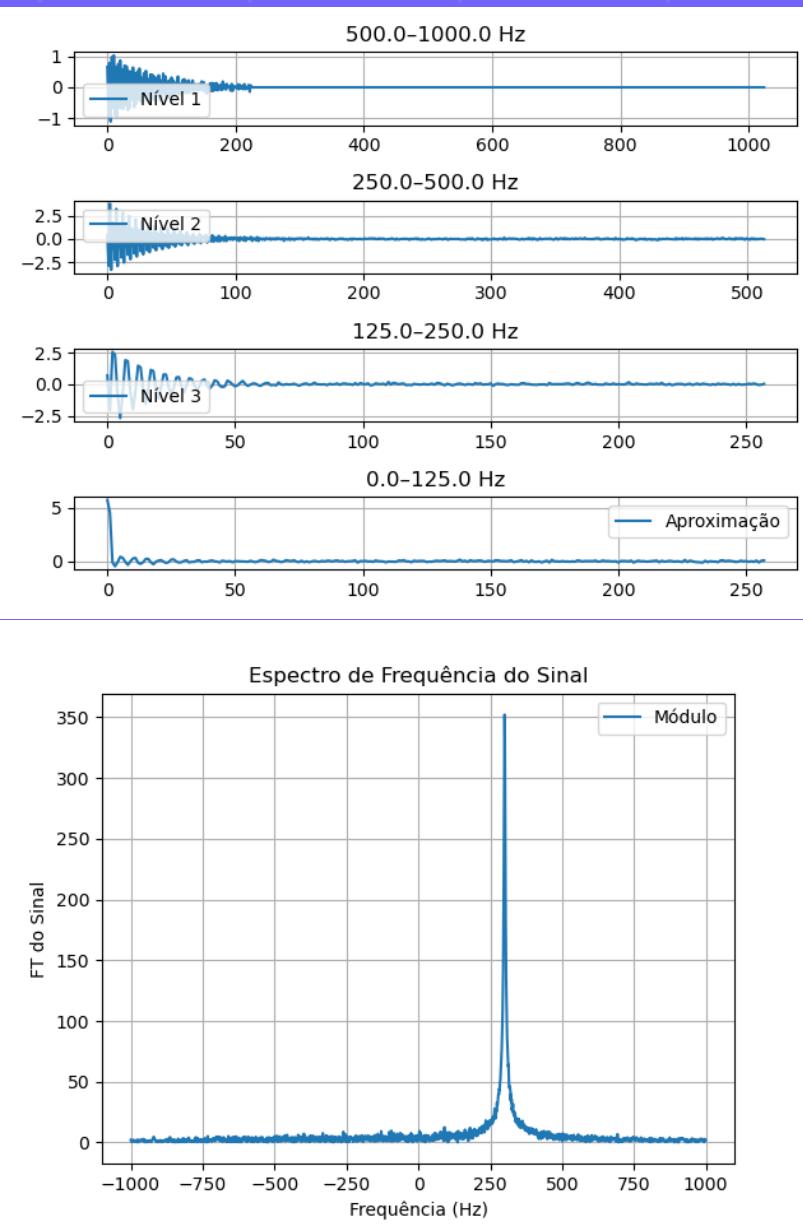
coif1

zoom FT(Sinal B)

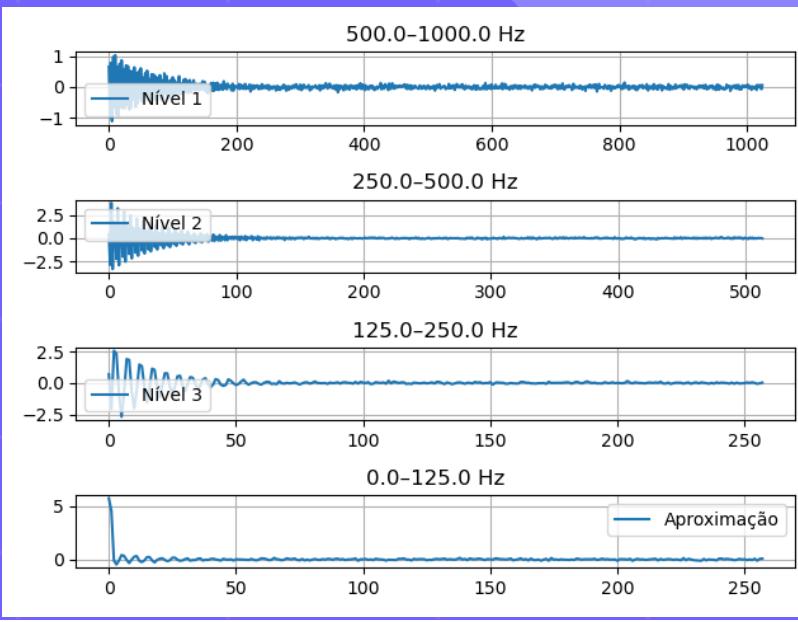


sym2

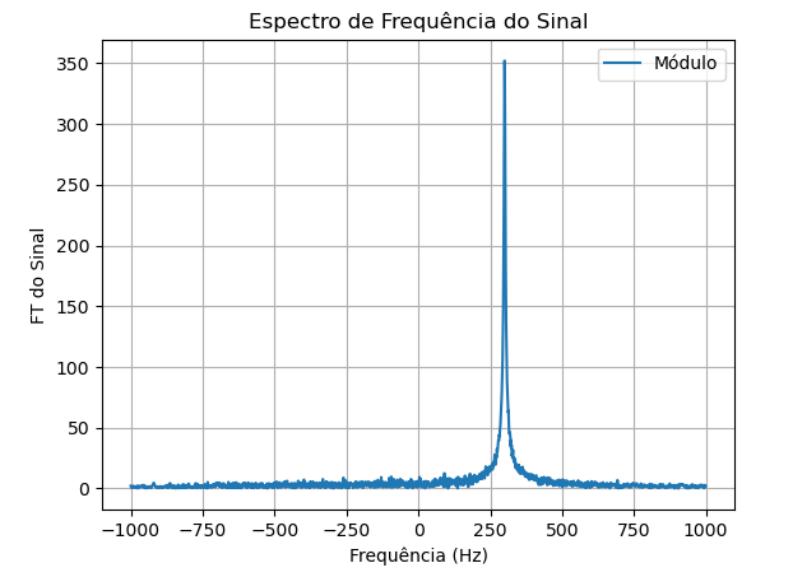
Filtragem em um único nível



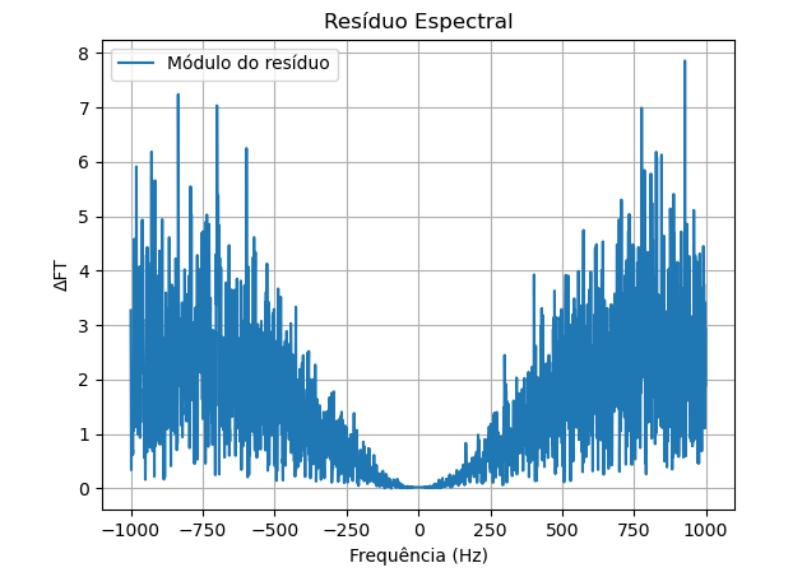
Filtragem da
WT do Sinal B



WT do Sinal B
original

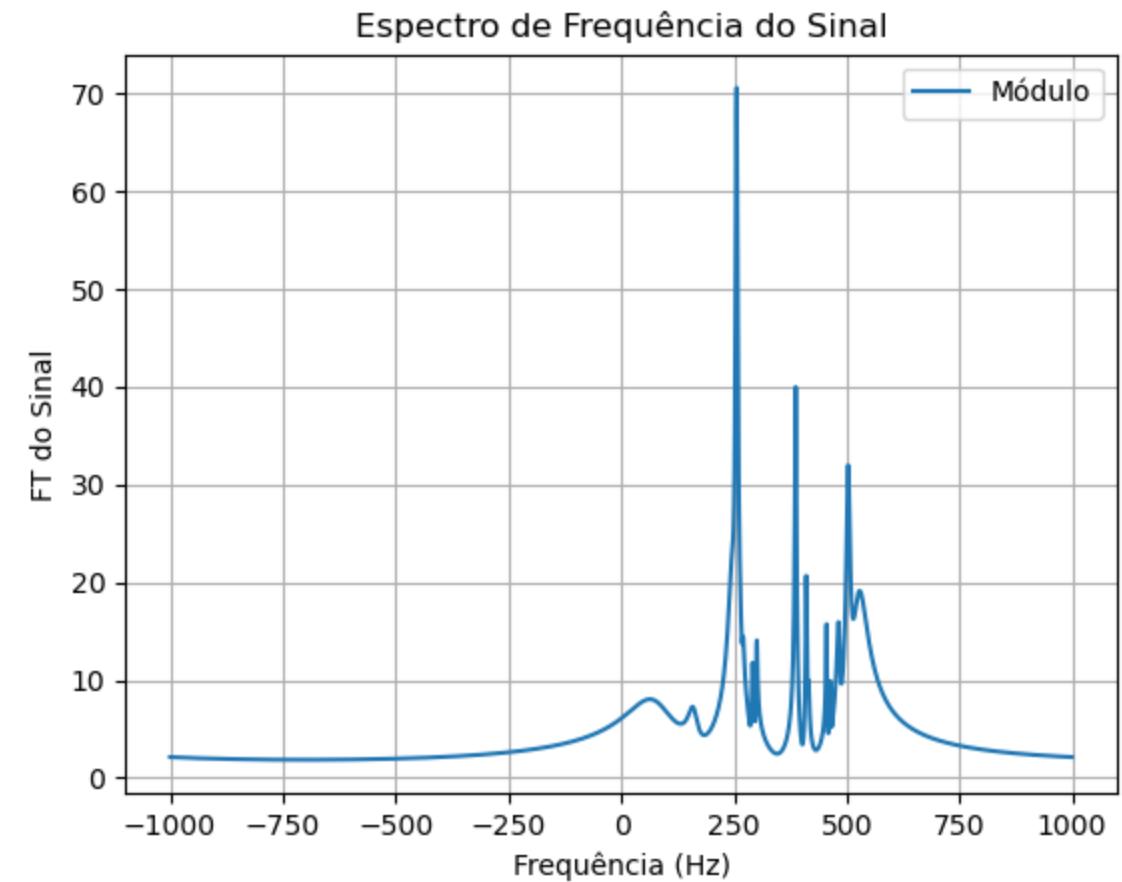
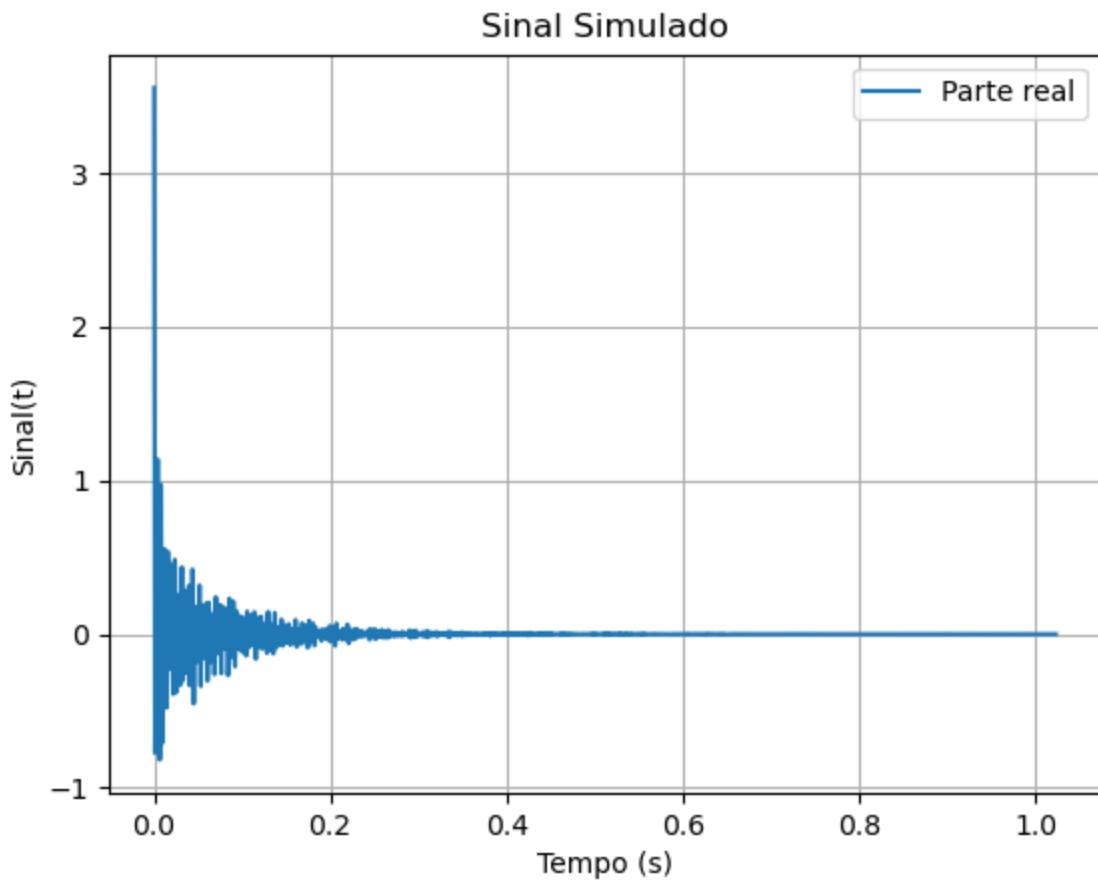


FT resultante

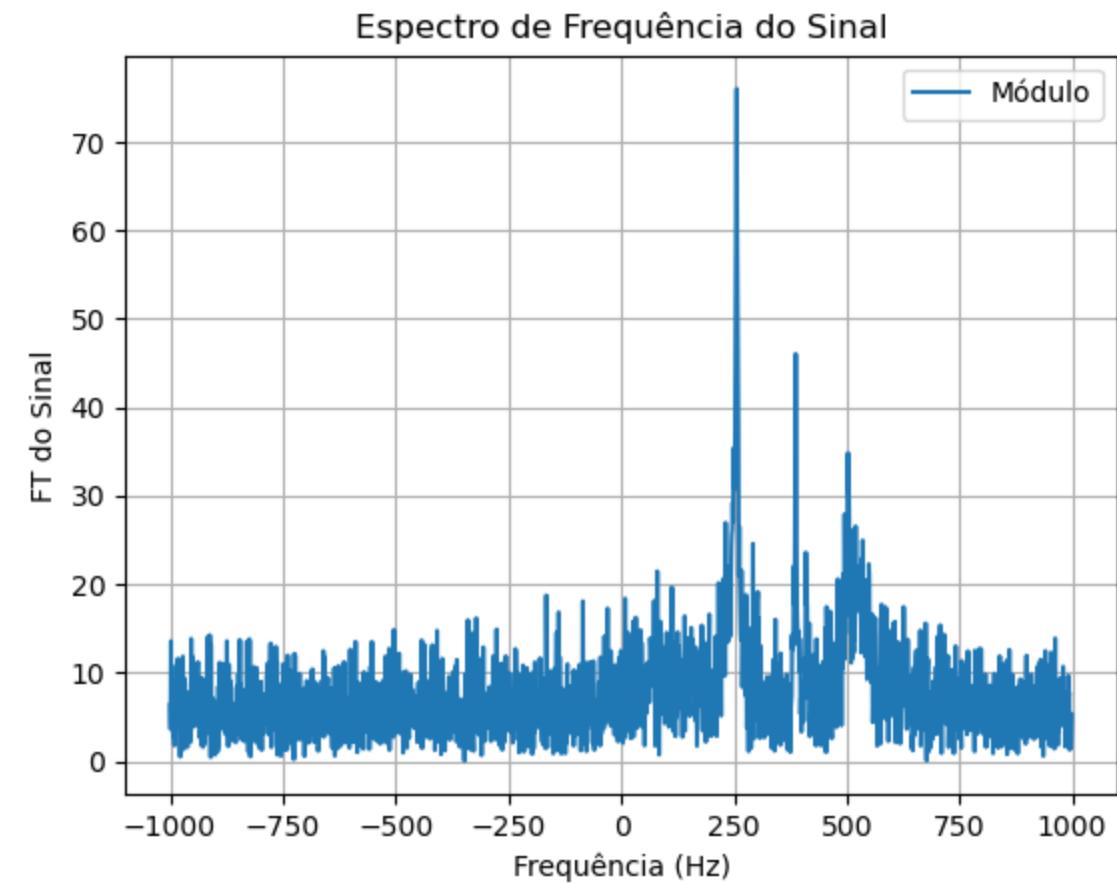
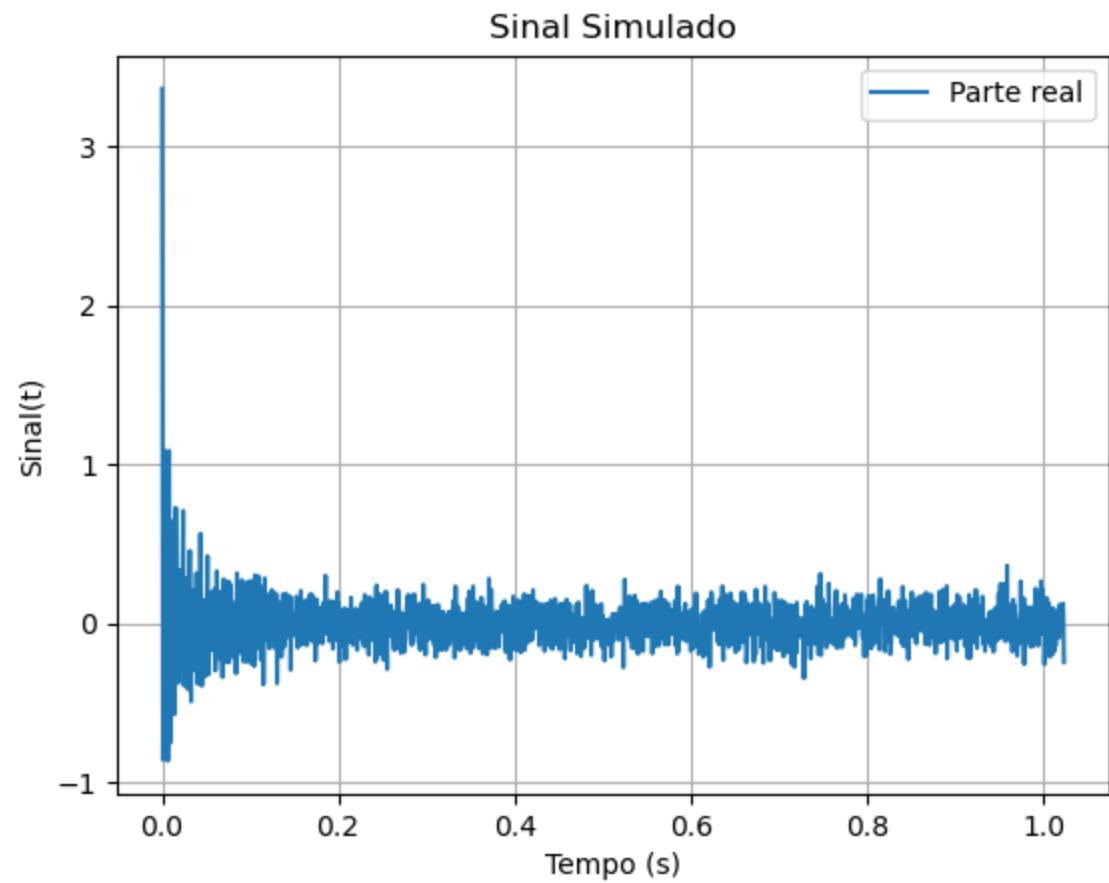


Resíduo

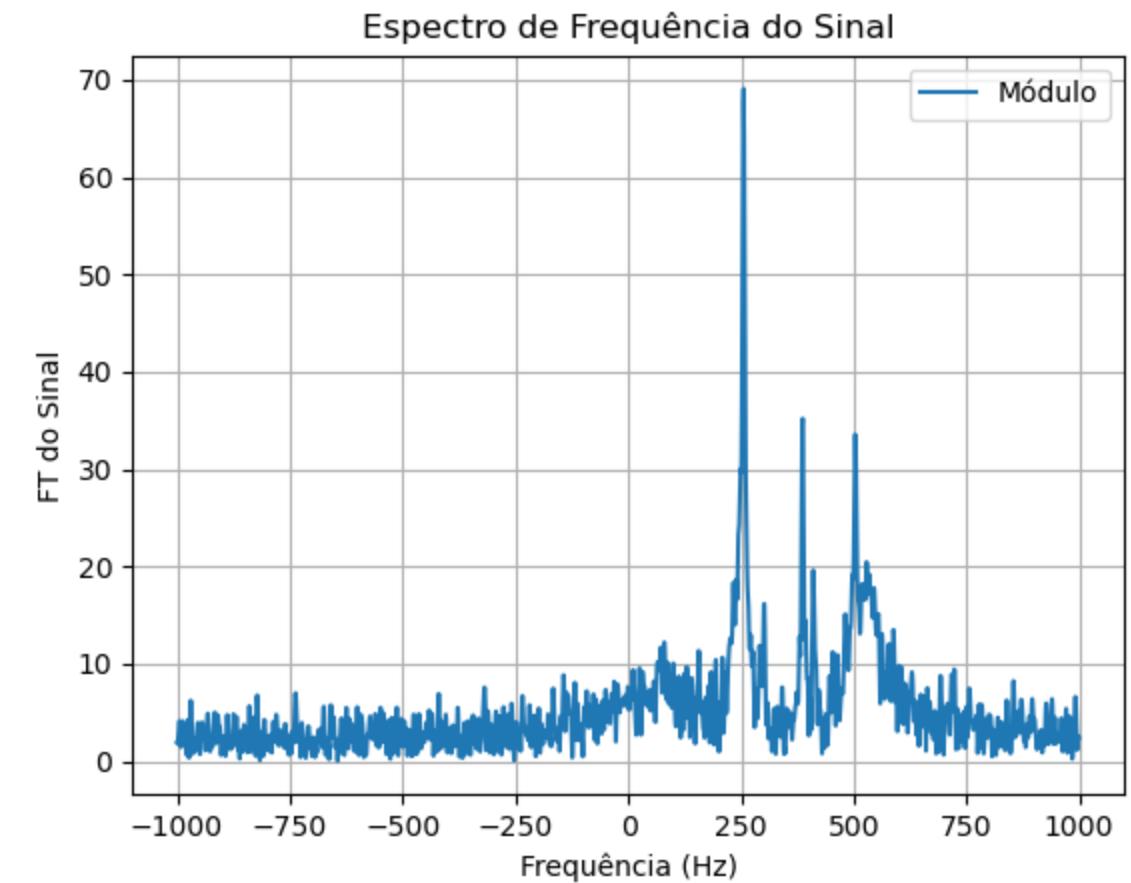
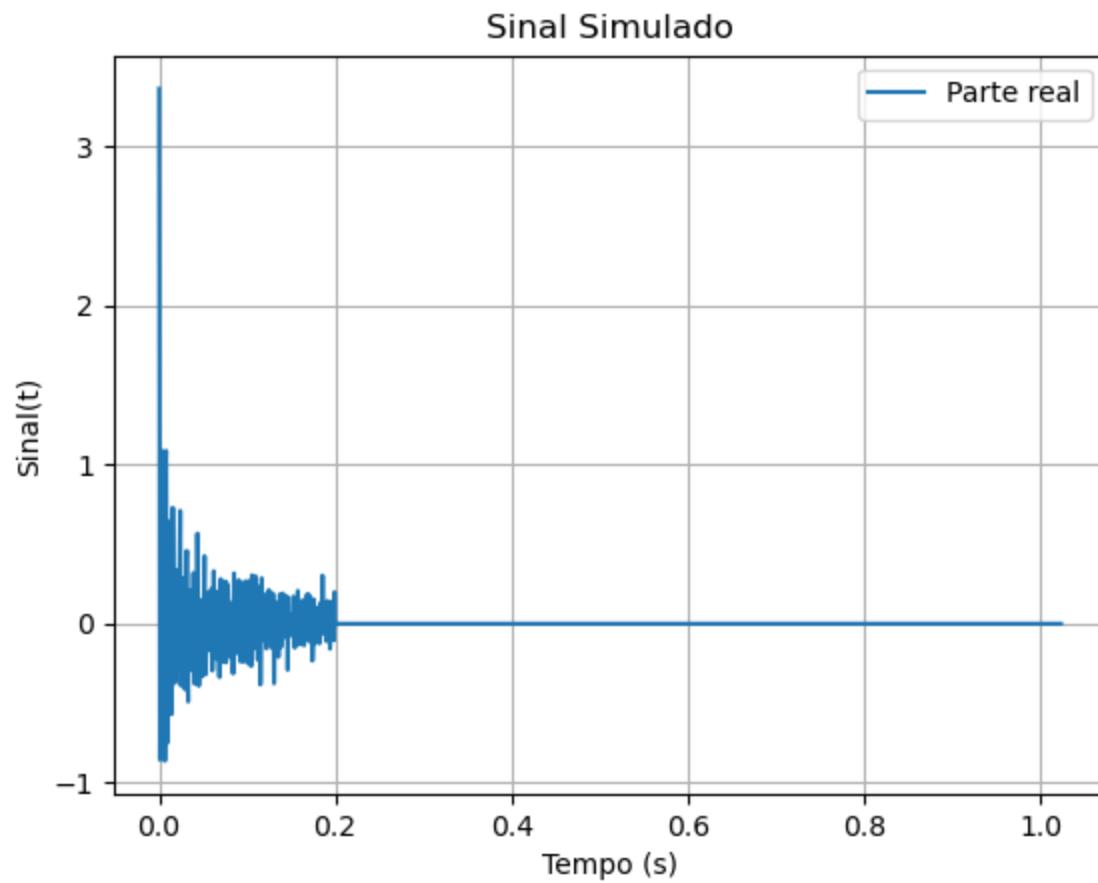
Sinal típico de Ressonância Magnética



Sinal típico de Ressonância Magnética corrompido



Sinal típico de Ressonância Magnética filtrado por Wavelet

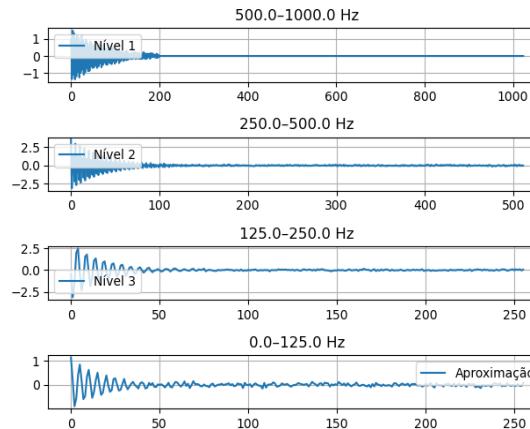


Filtragem por haar em nível único invadindo a área do Sinal B

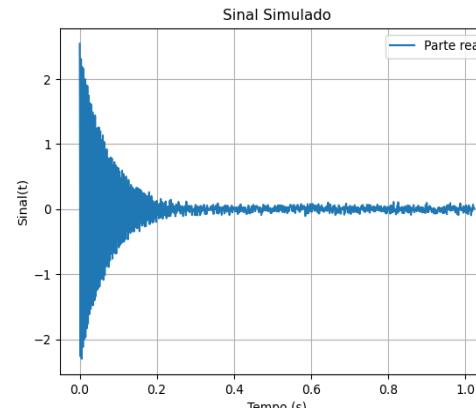
Nível 1

corte

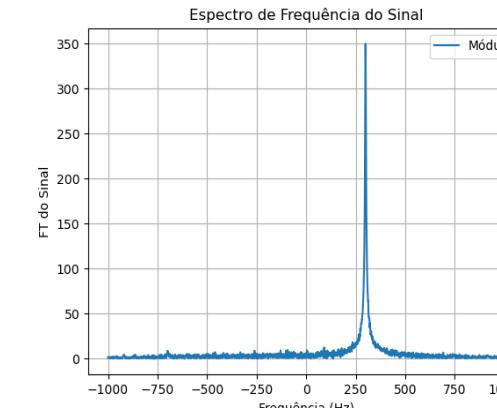
WT



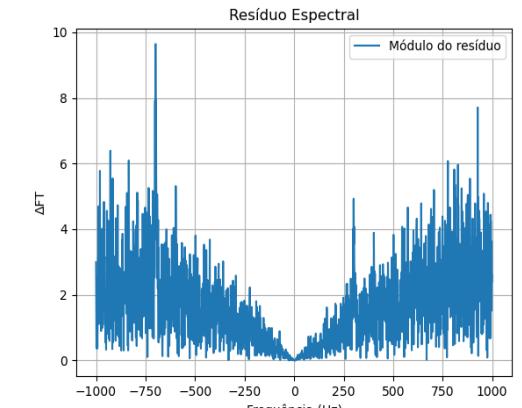
IWT



FT

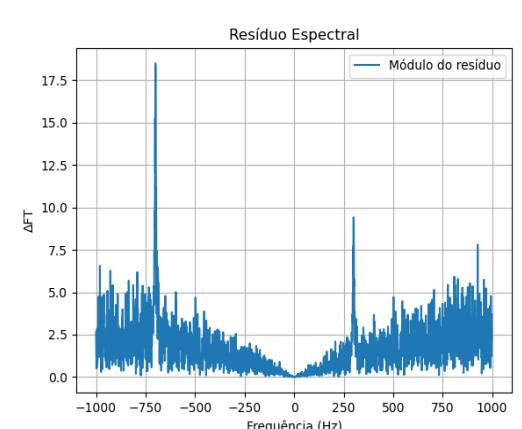
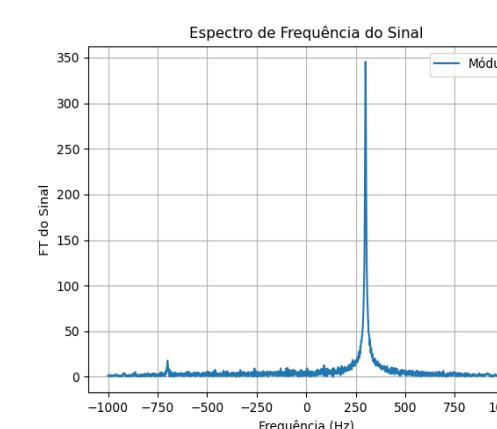
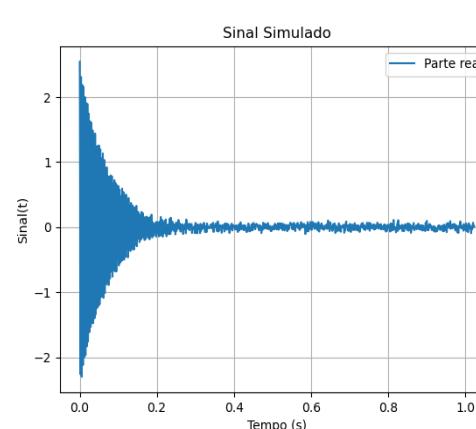
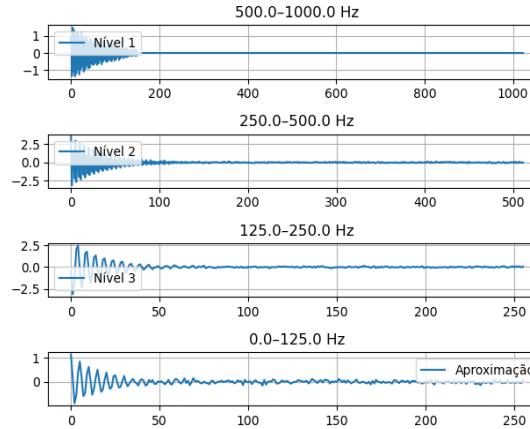


Res



200

150

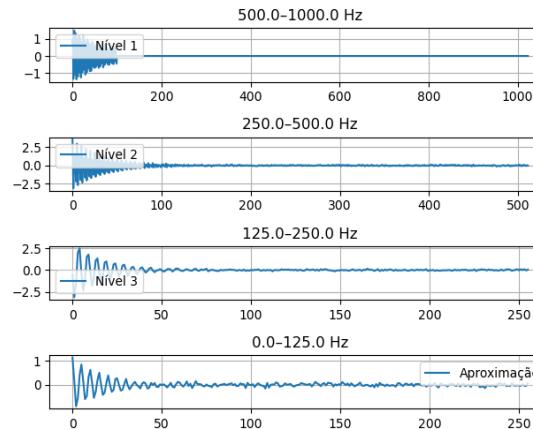


Filtragem por haar em nível único invadindo a área do Sinal B

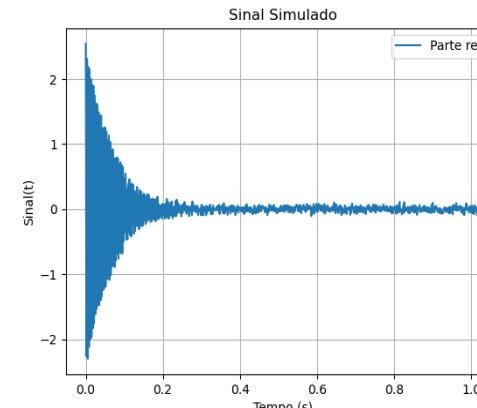
Nível 1

corte

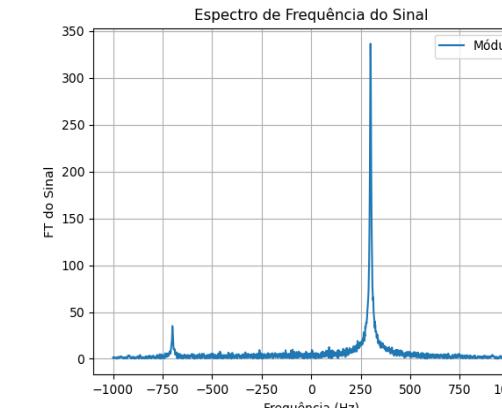
WT



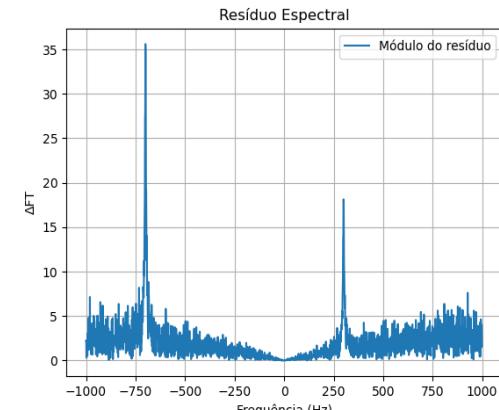
IWT



FT

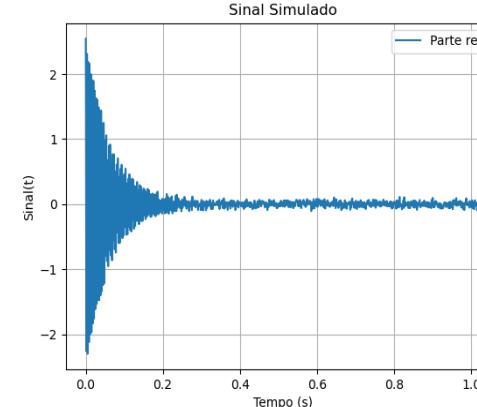


Res

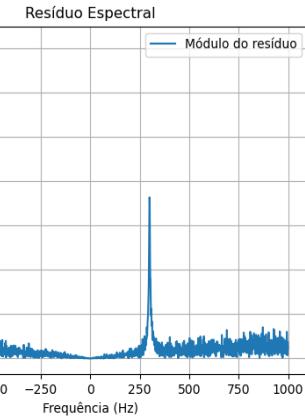
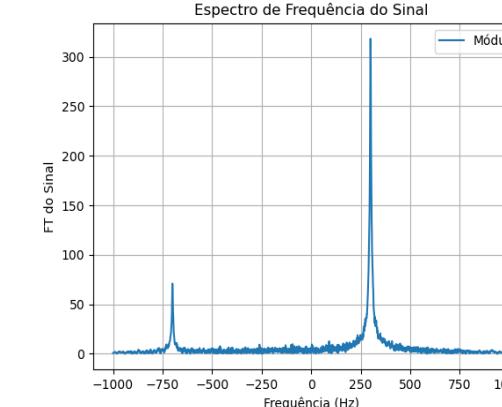


100

50



Sinal Simulado



Tempo (s)

Tempo (s)

Frequência (Hz)

Frequência (Hz)

Frequência (Hz)

Filtragem por haar em nível único invadindo a área do Sinal B

Nível 1

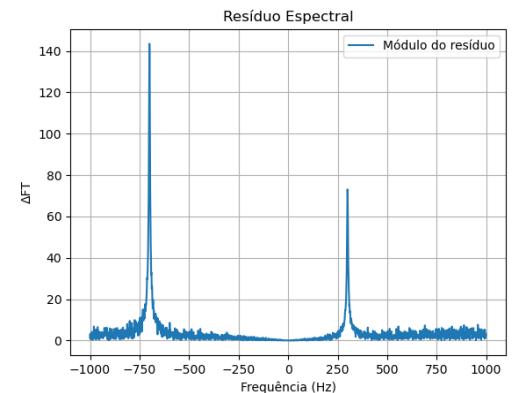
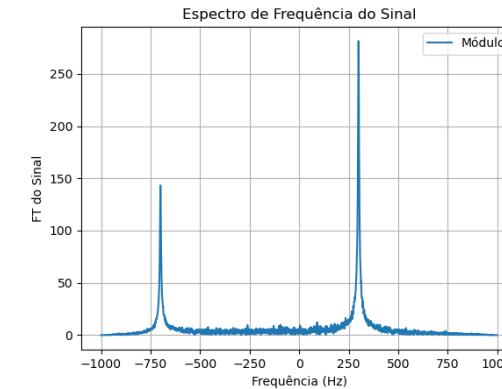
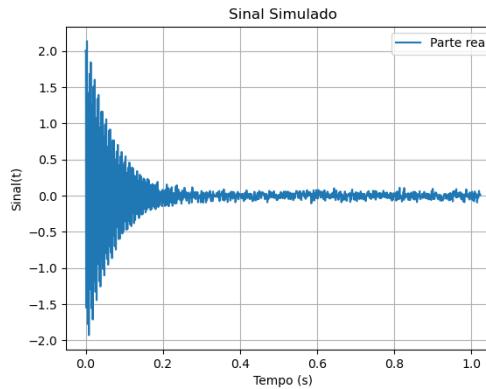
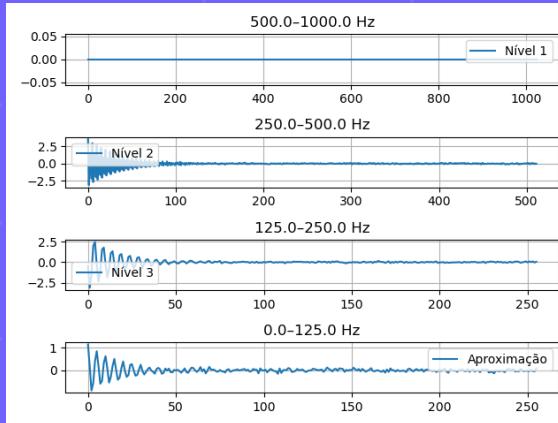
corte

WT

IWT

FT

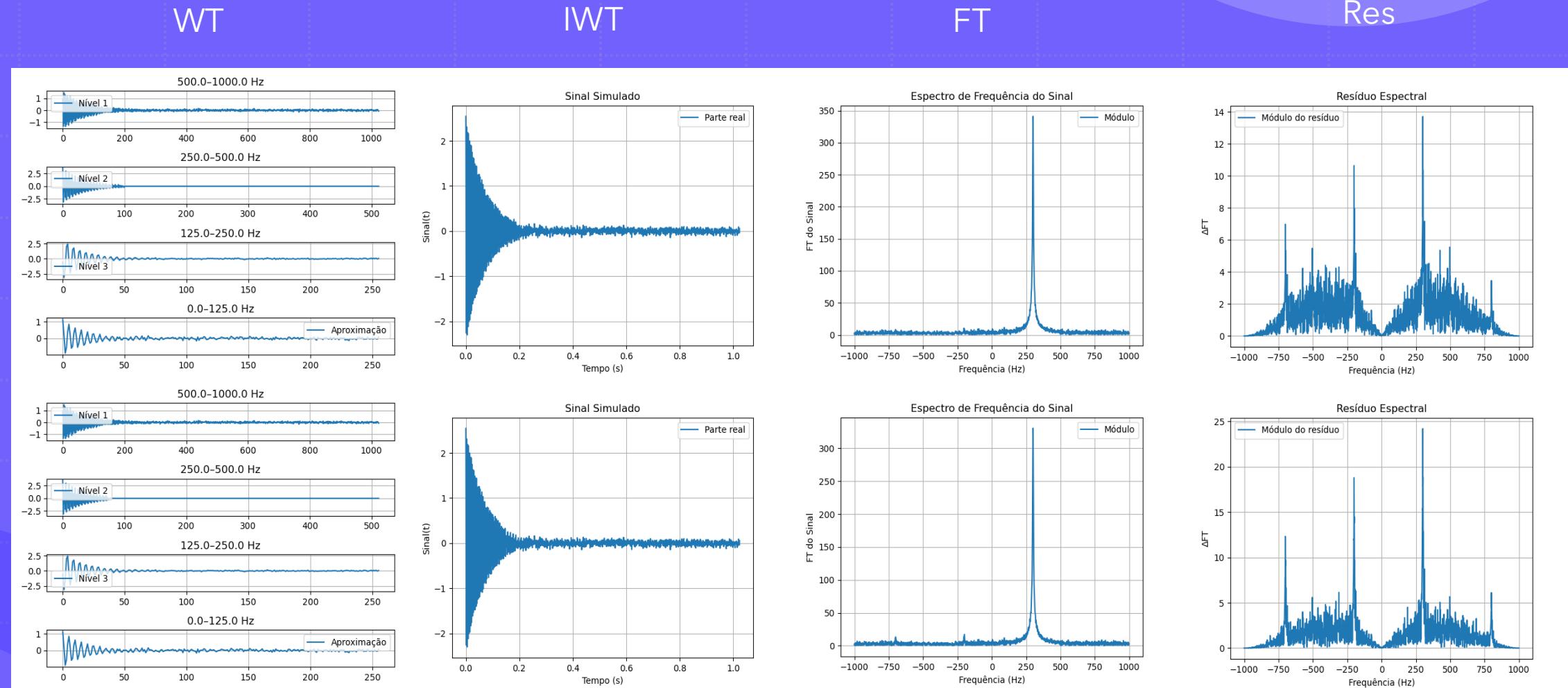
Res



Filtragem por haar em nível único invadindo a área do Sinal B

Nível 2

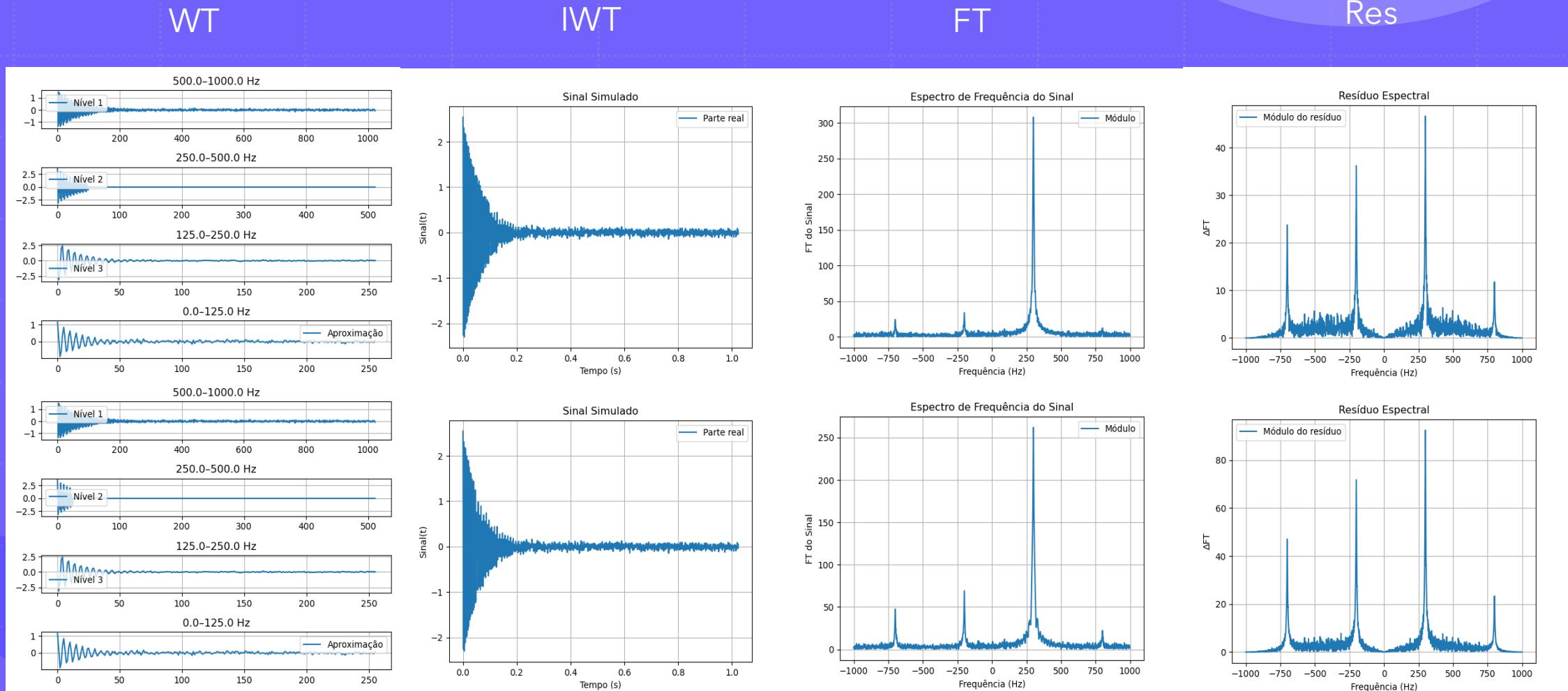
corte



Filtragem por haar em nível único invadindo a área do Sinal B

Nível 2

corte



Filtragem por haar em nível único invadindo a área do Sinal B

Nível 2

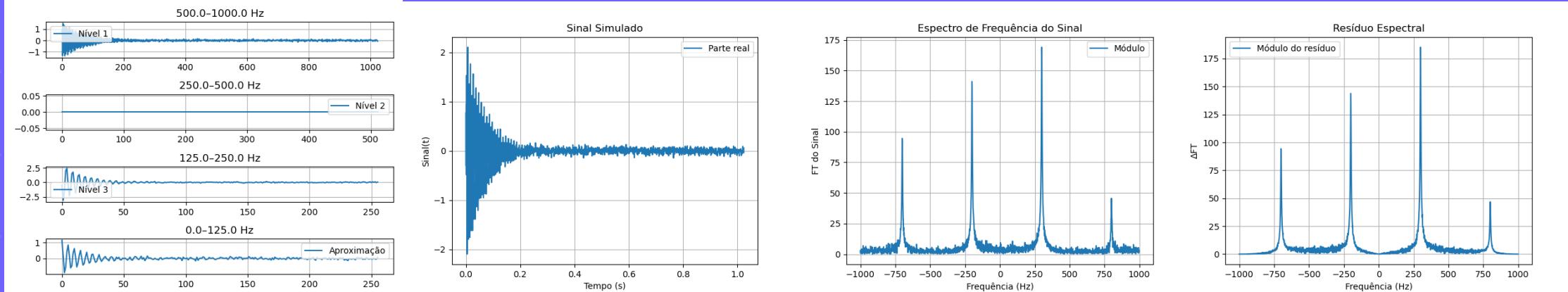
corte

WT

IWT

FT

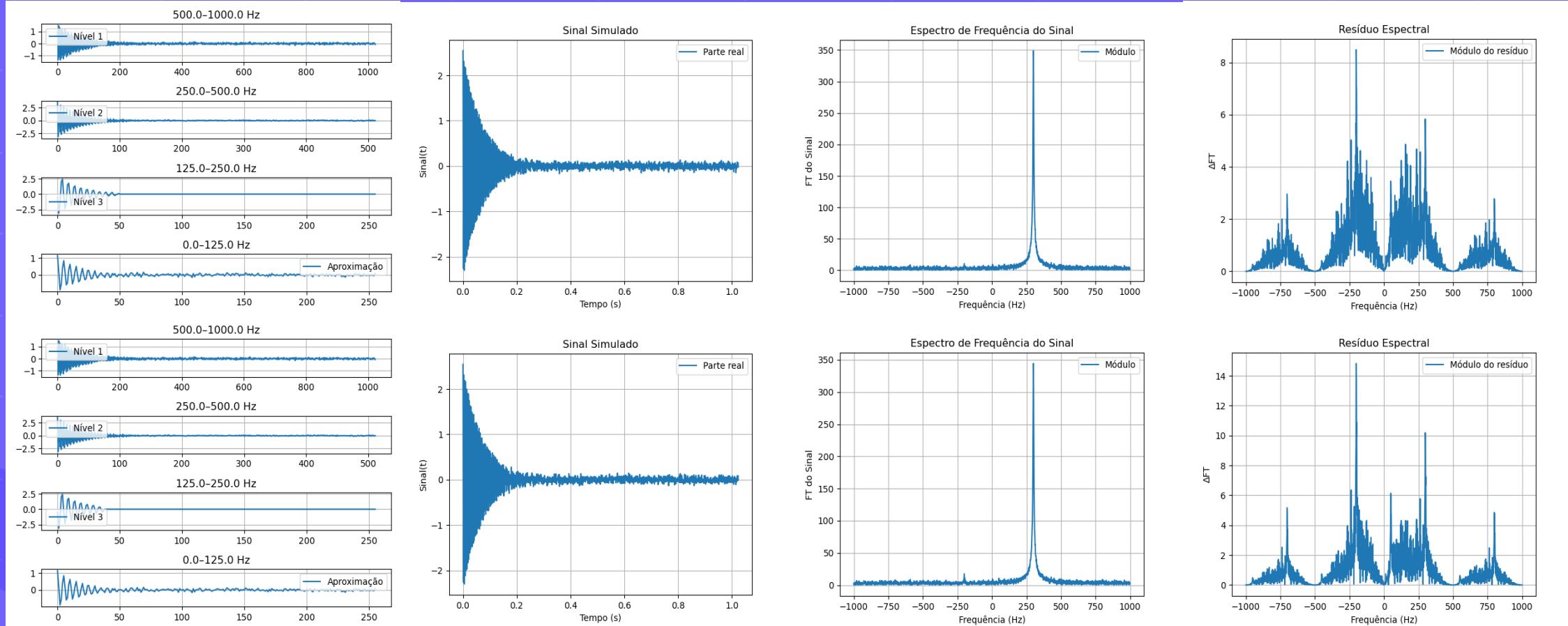
Res



Filtragem por haar em nível único invadindo a área do Sinal B

Nível 3

corte

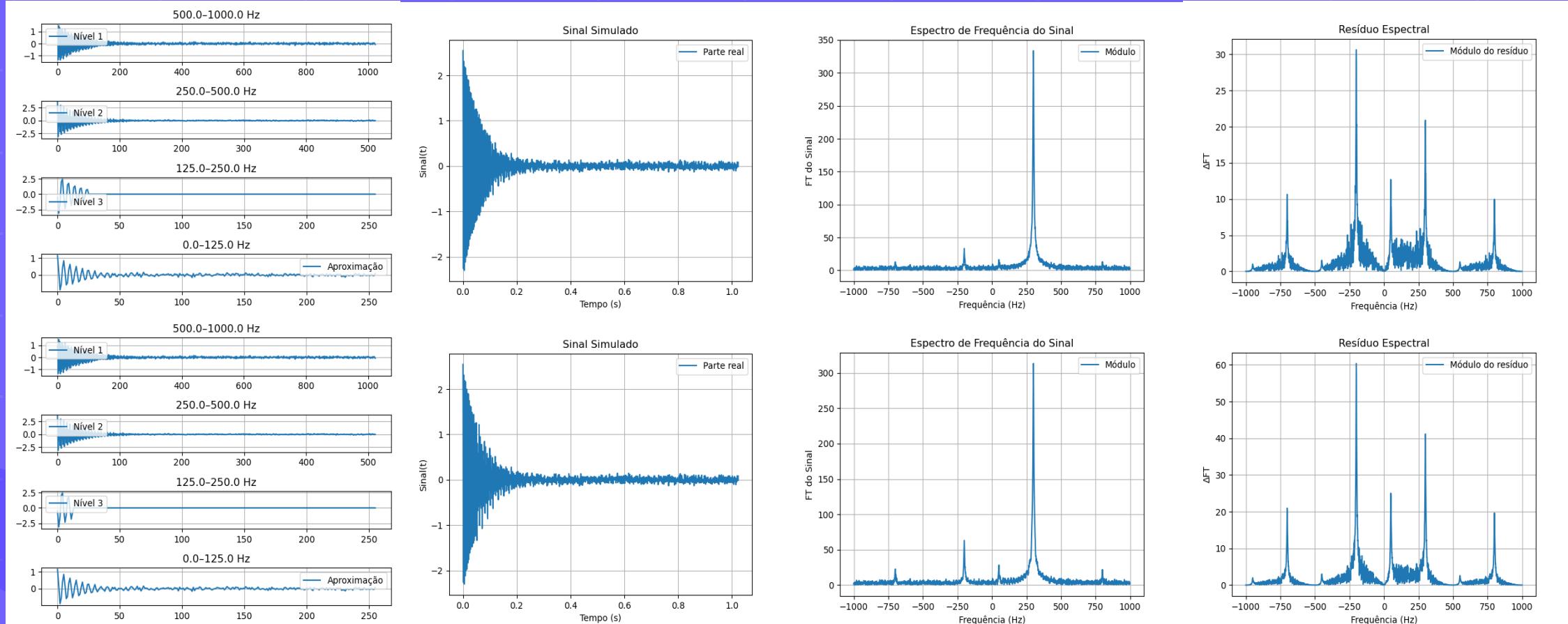


38

Filtragem por haar em nível único invadindo a área do Sinal B

Nível 3

corte



13

Filtragem por haar em nível único invadindo a área do Sinal B

Nível 3

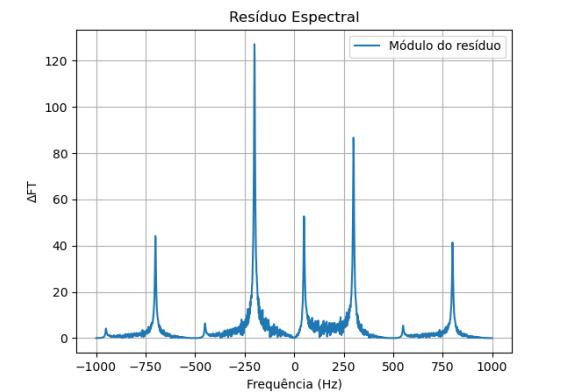
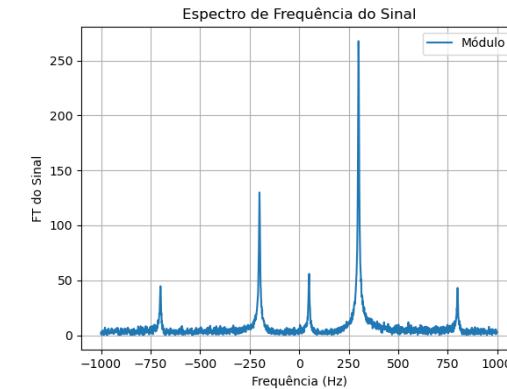
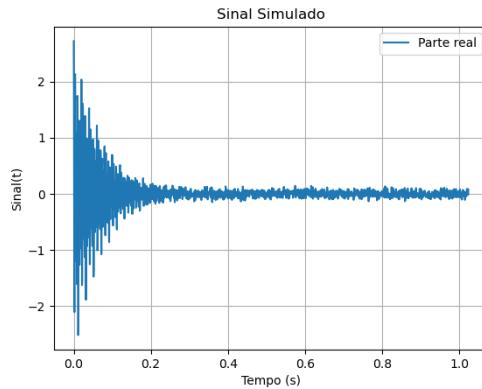
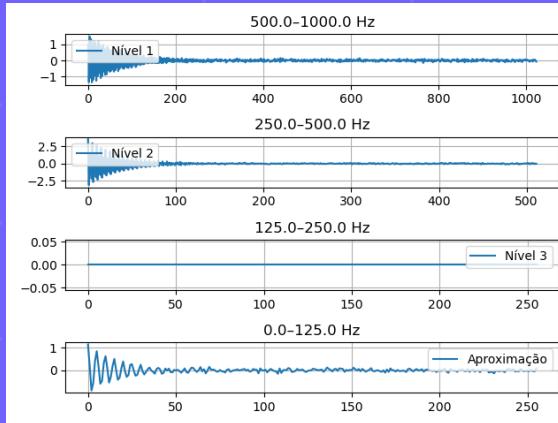
corte

WT

IWT

FT

Res

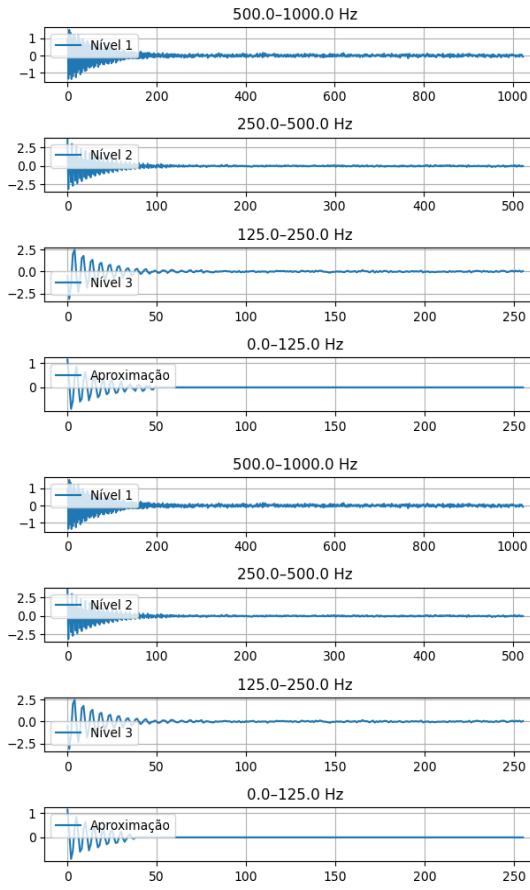


Filtragem por haar em nível único invadindo a área do Sinal B

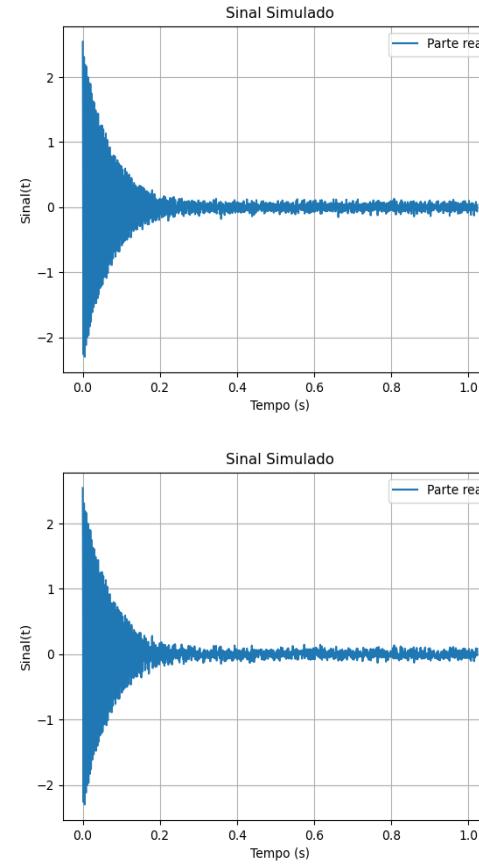
Aprox.

corte

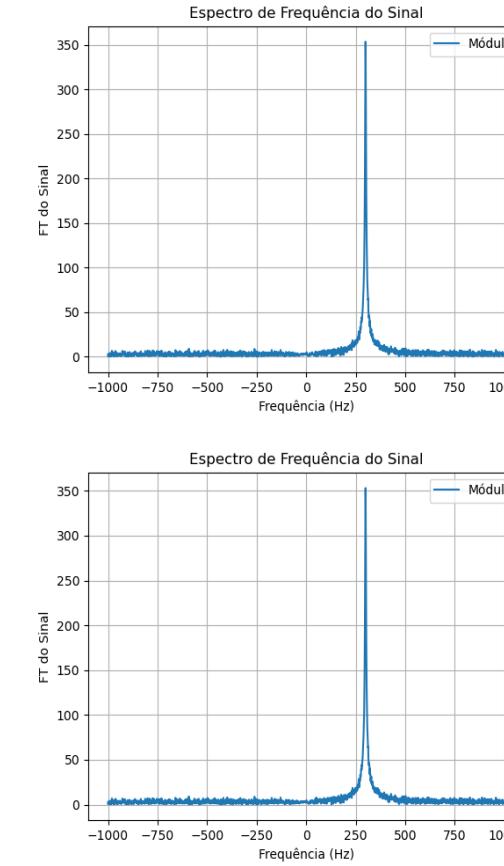
WT



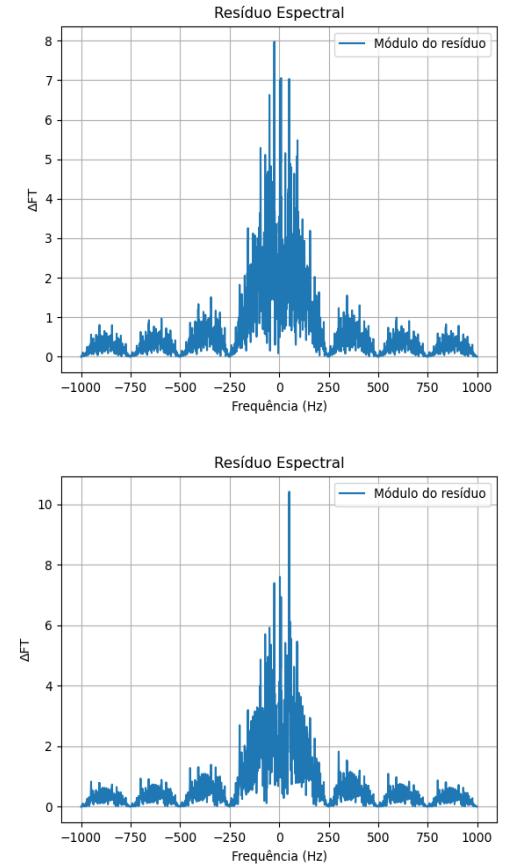
IWT



FT



Res



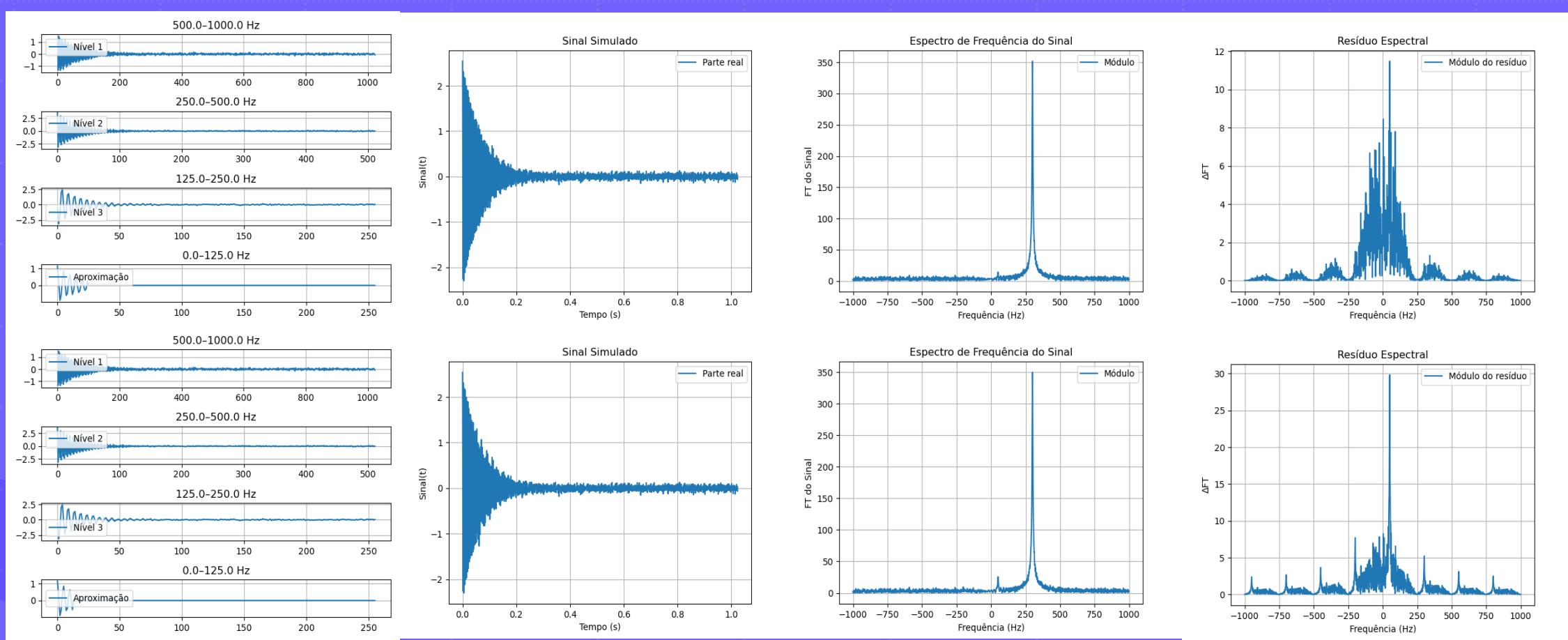
50

38

Filtragem por haar em nível único invadindo a área do Sinal B

Aprox.

corte



Filtragem por haar em nível único invadindo a área do Sinal B

Aprox.

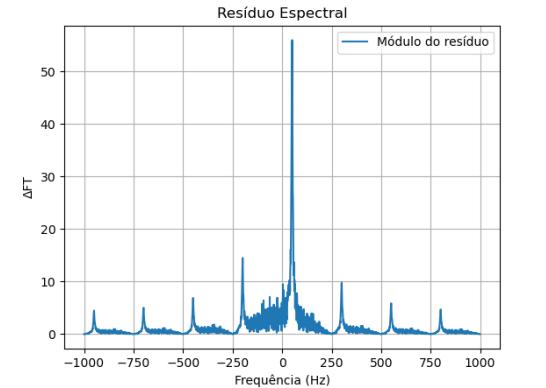
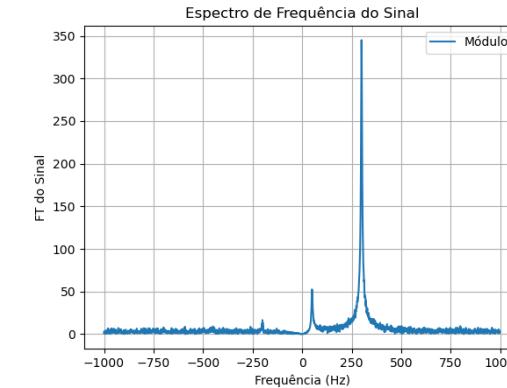
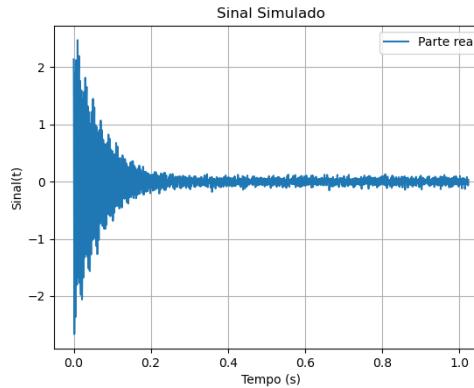
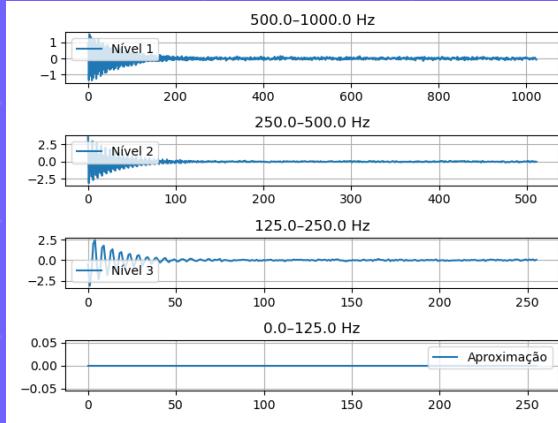
corte

WT

IWT

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Res

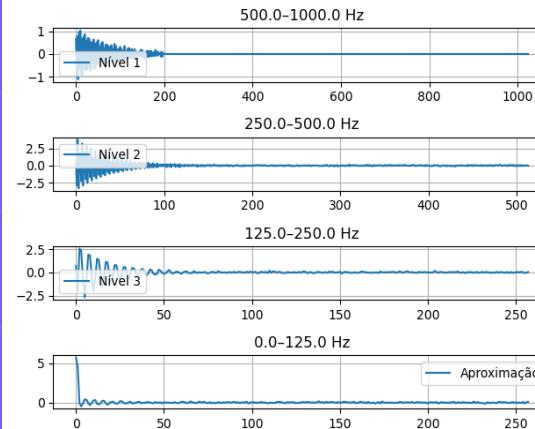


Filtragem por sym2 em nível único invadindo a área do Sinal B

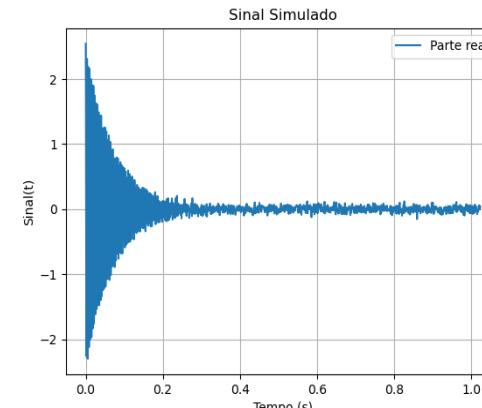
Nível 1

corte

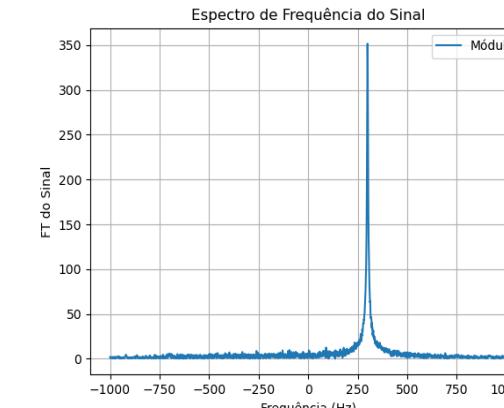
WT



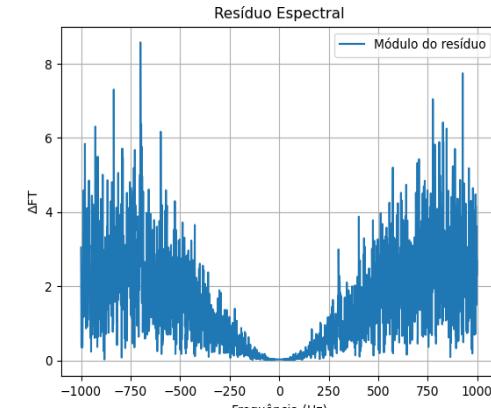
IWT



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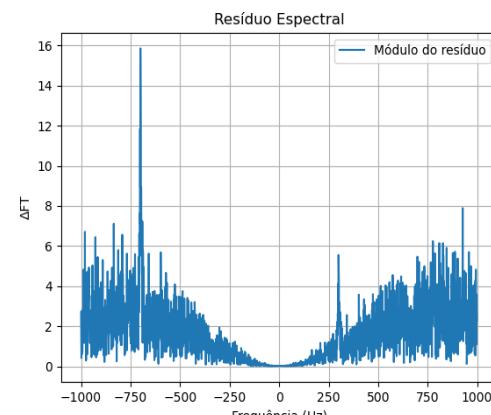
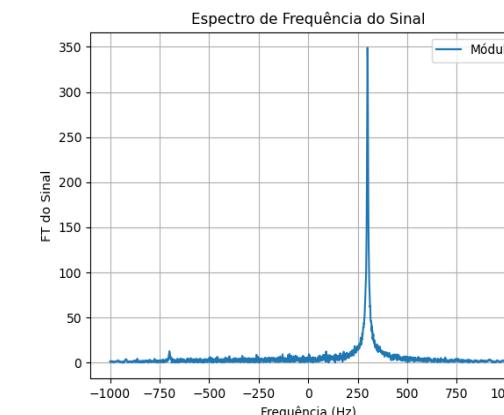
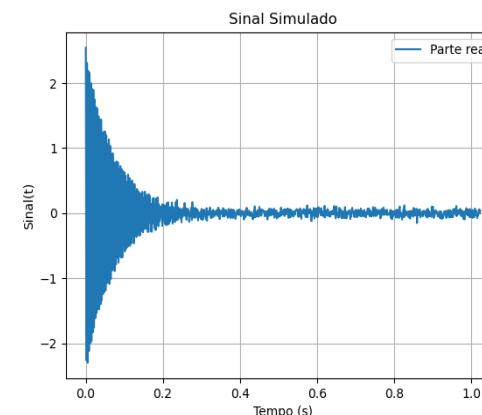
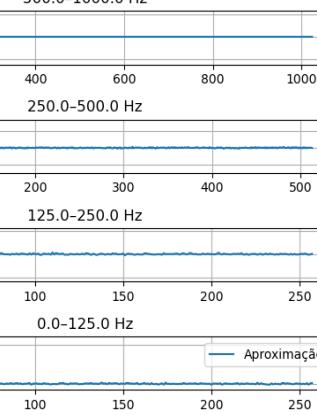


Res



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150



Filtragem por sym2 em nível único invadindo a área do Sinal B

Nível 1

corte

WT

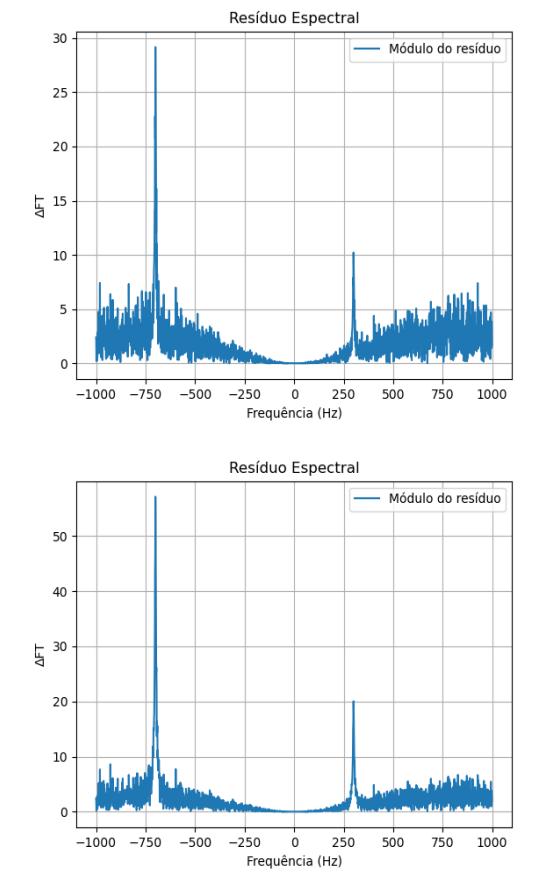
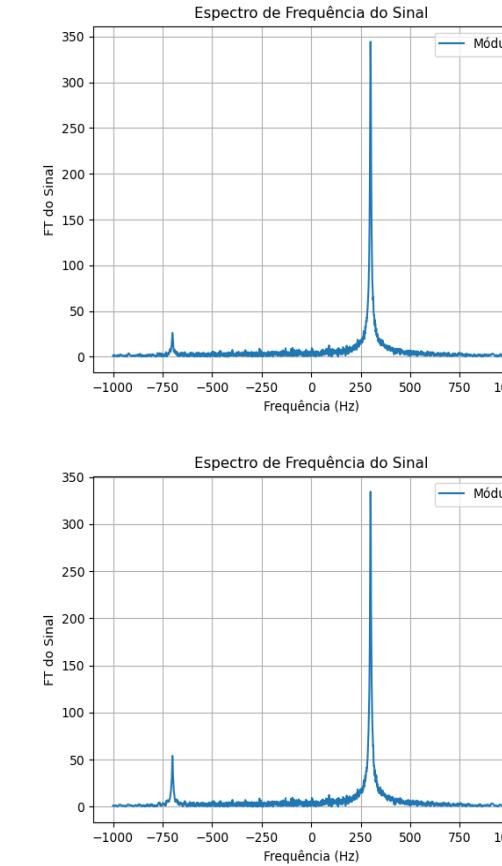
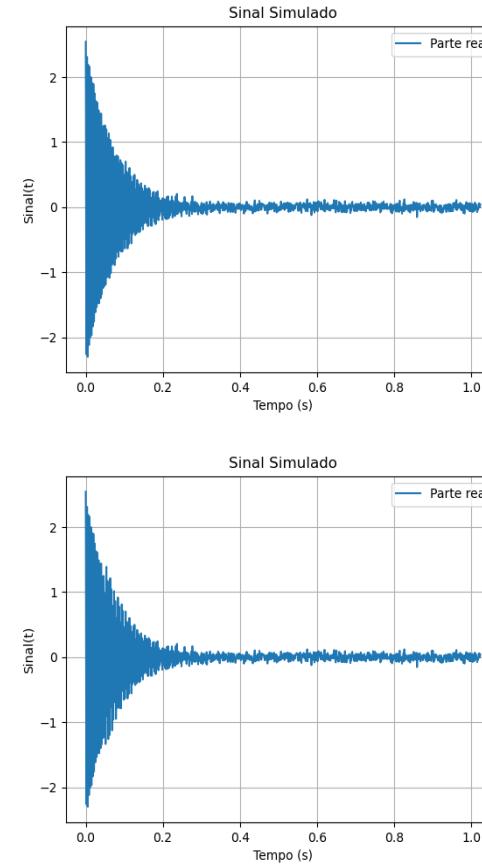
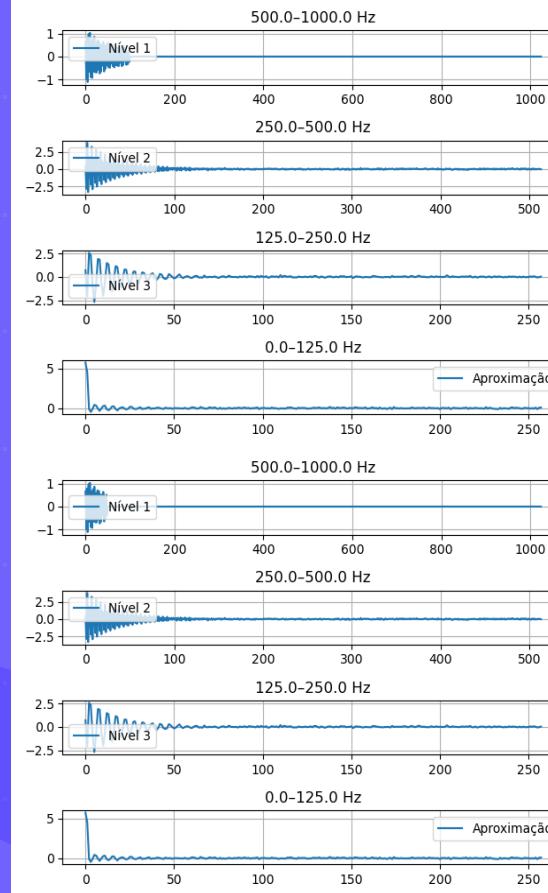
IWT

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100

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Filtragem por sym2 em nível único invadindo a área do Sinal B

Nível 1

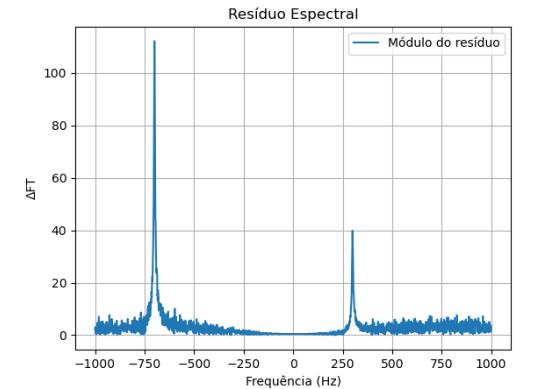
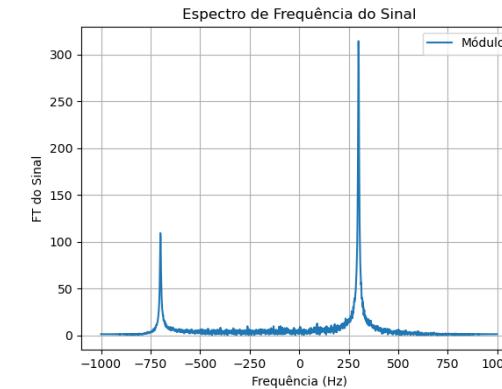
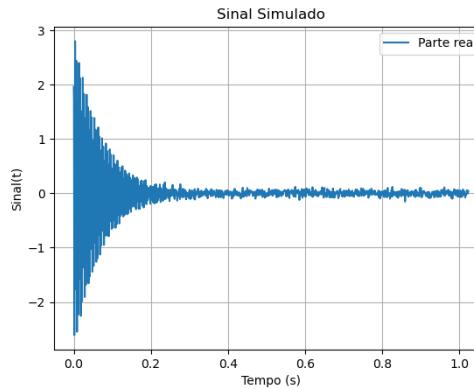
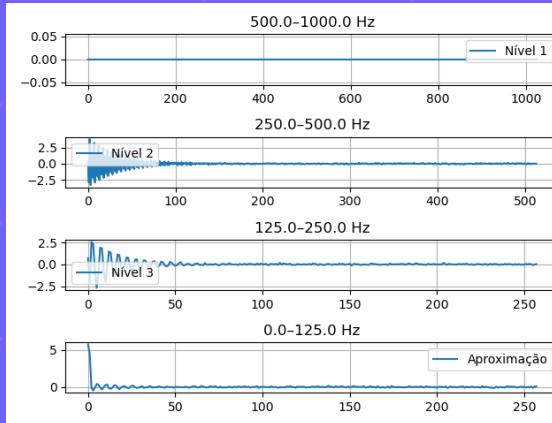
corte

WT

IWT

FT

Res

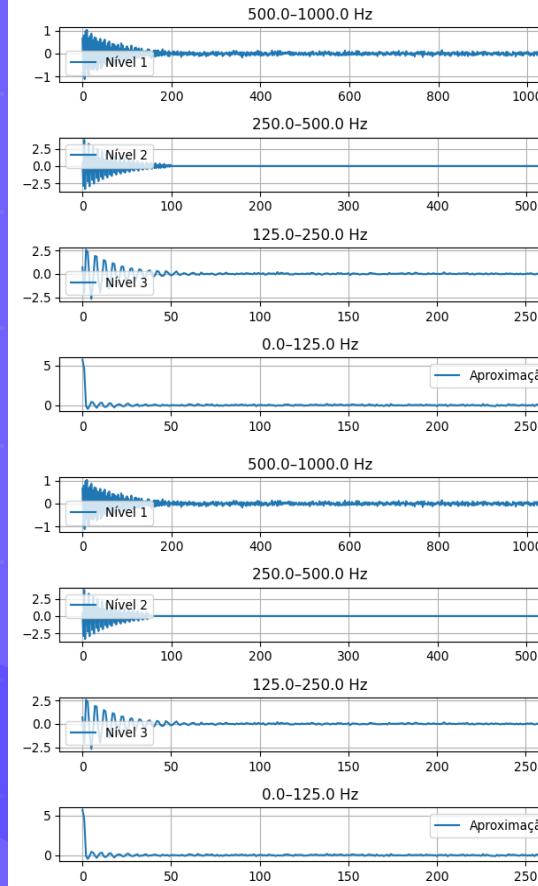


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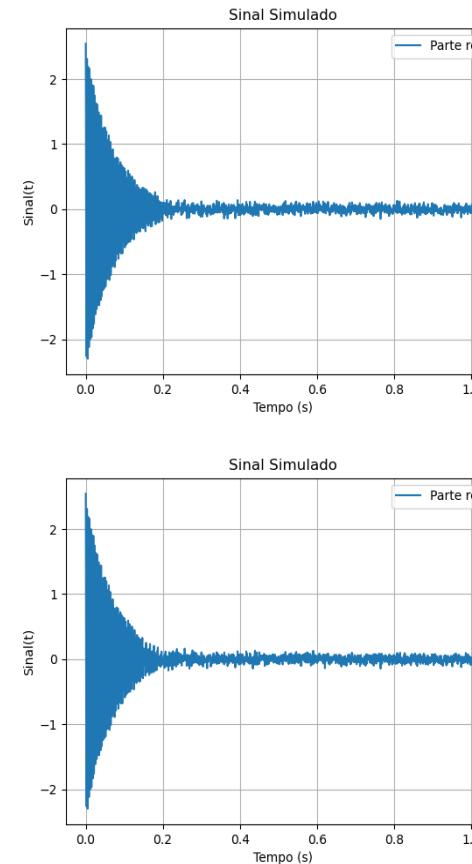
Filtragem por sym2 em nível único invadindo a área do Sinal B

corte

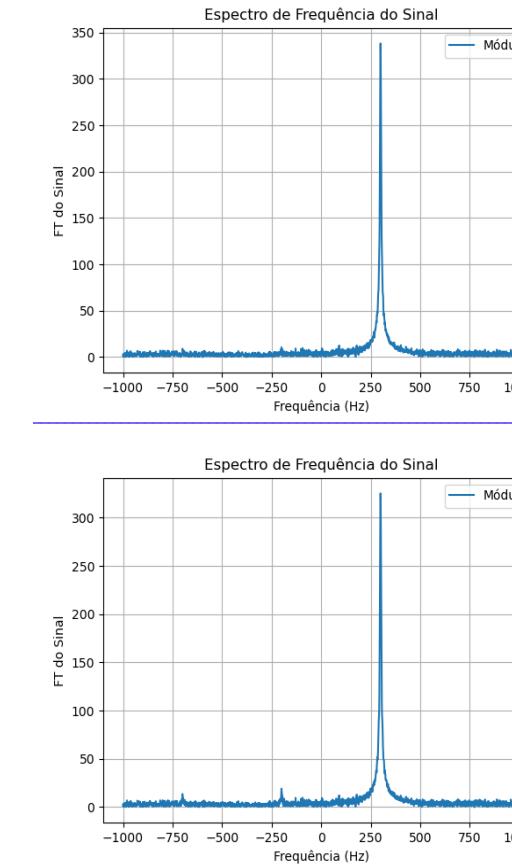
WT



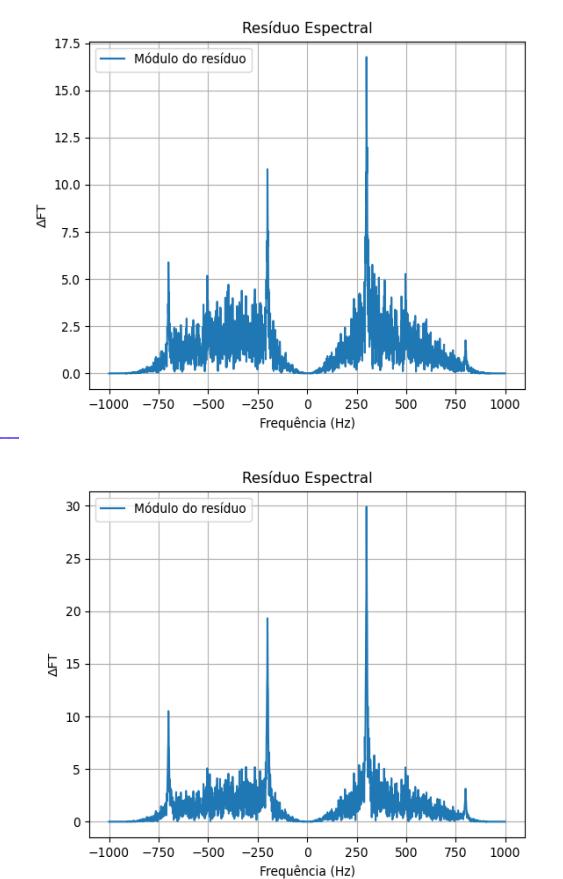
IWT



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Res



100

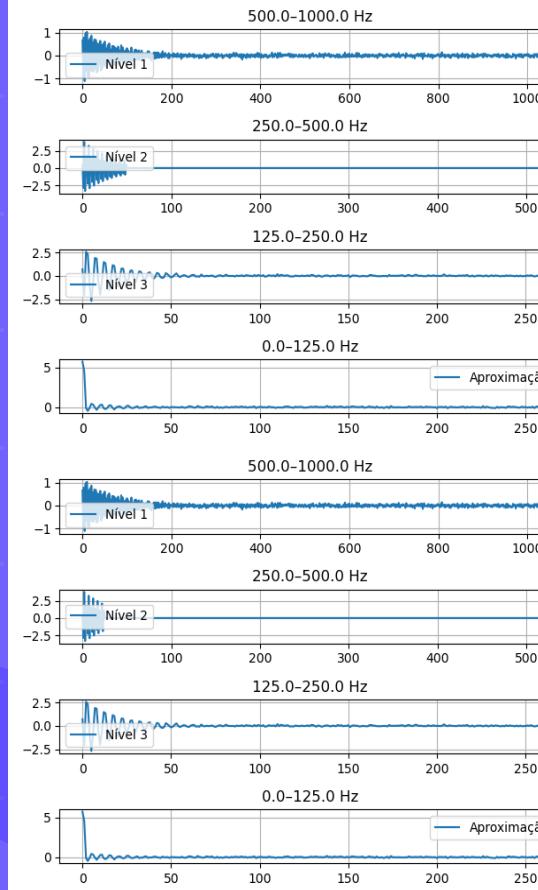
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Nível 2

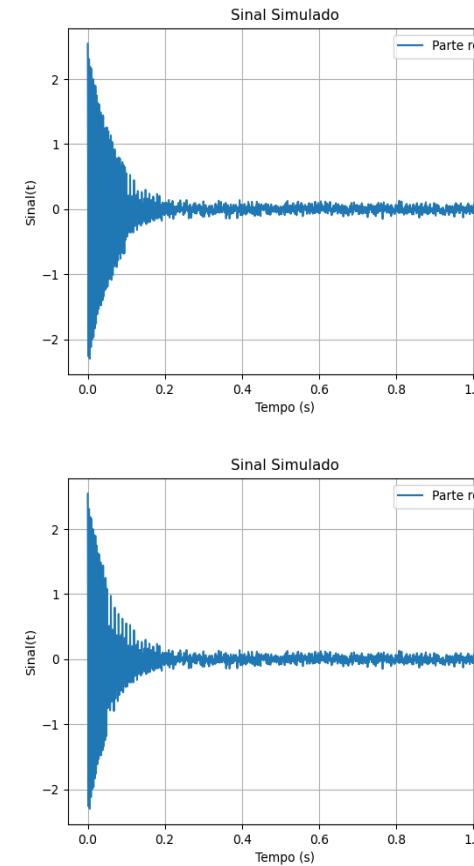
Filtragem por sym2 em nível único invadindo a área do Sinal B

corte

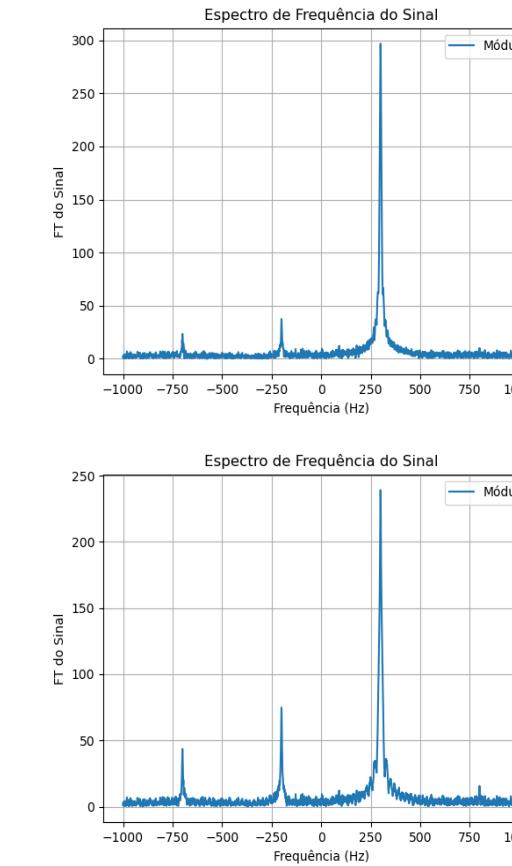
WT



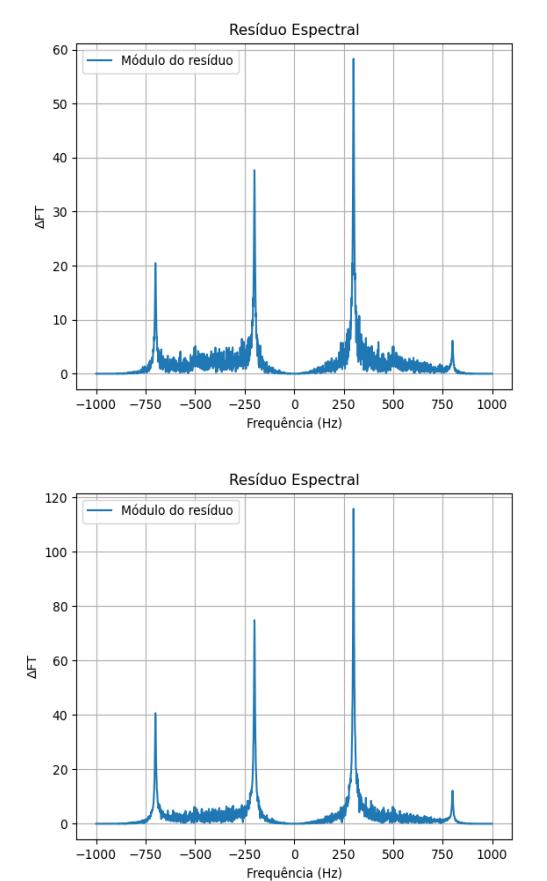
IWT



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Res



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25

Filtragem por sym2 em nível único invadindo a área do Sinal B

Nível 2

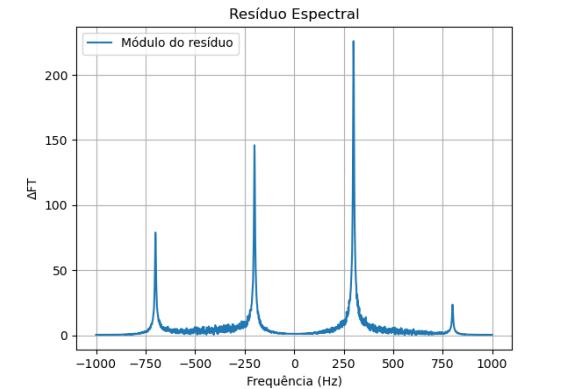
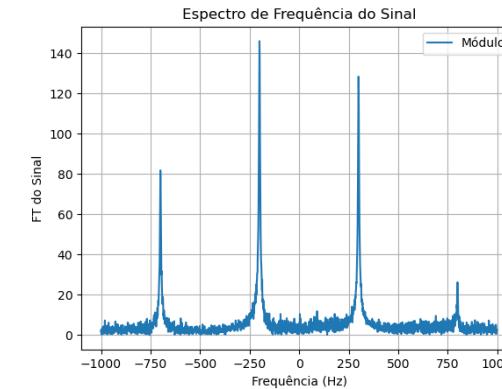
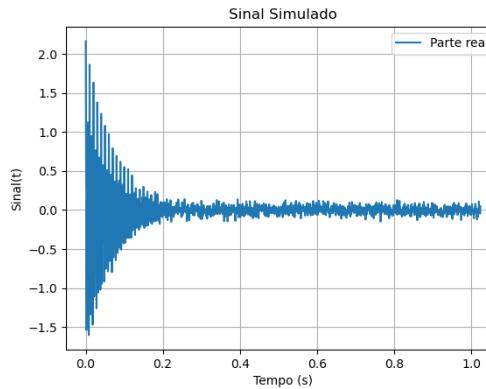
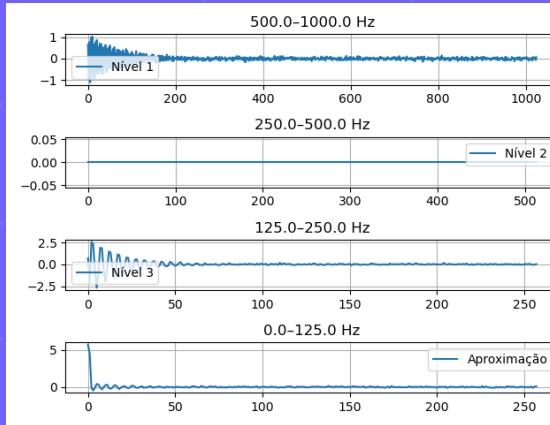
corte

WT

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Res



Filtragem por sym2 em nível único invadindo a área do Sinal B

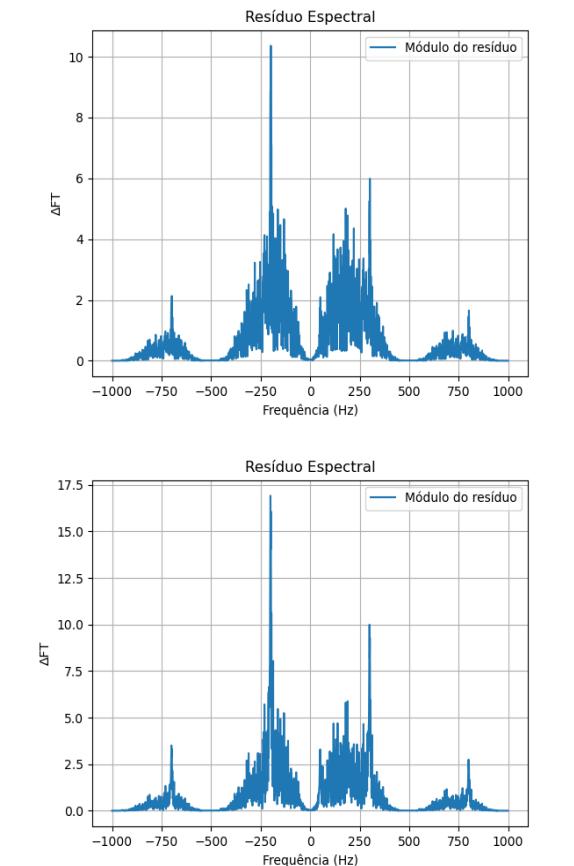
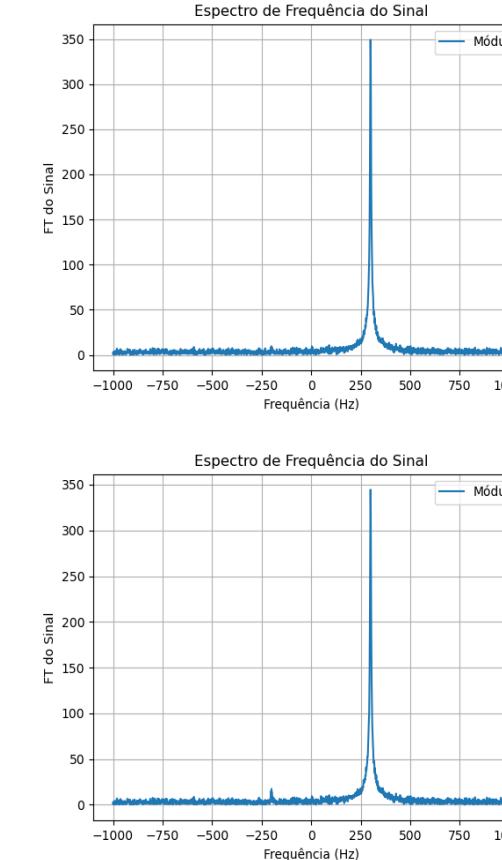
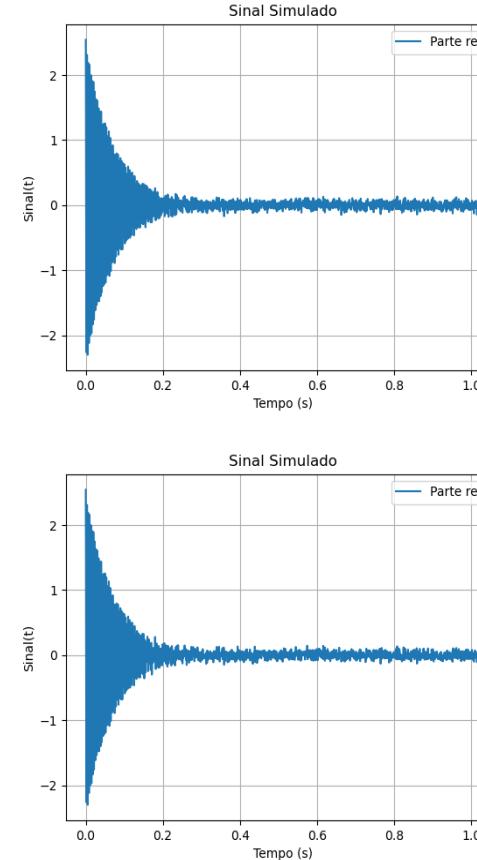
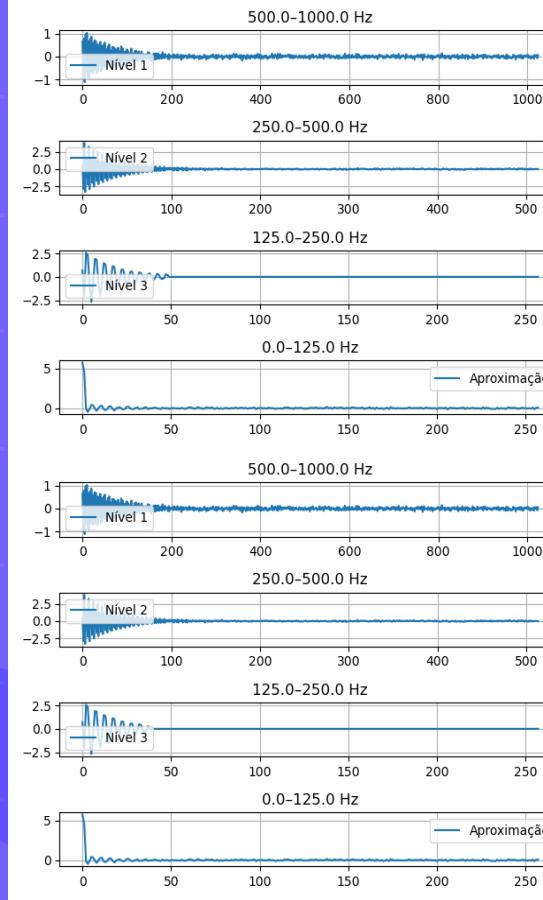
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Filtragem por sym2 em nível único invadindo a área do Sinal B

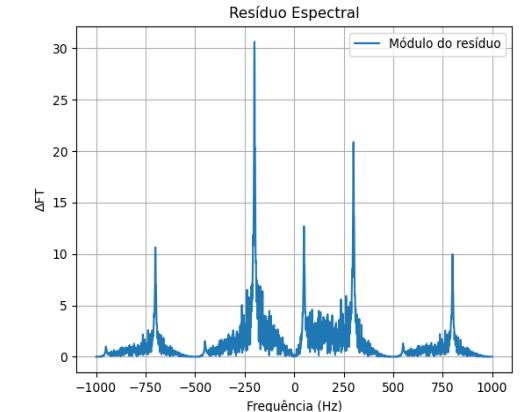
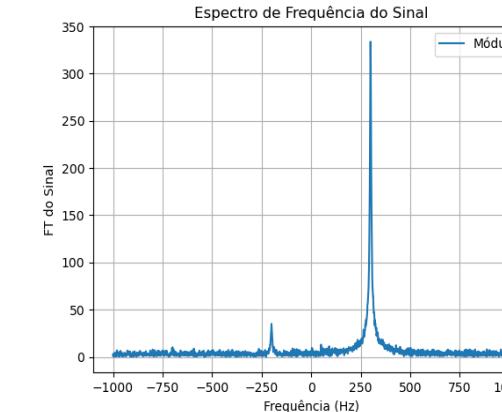
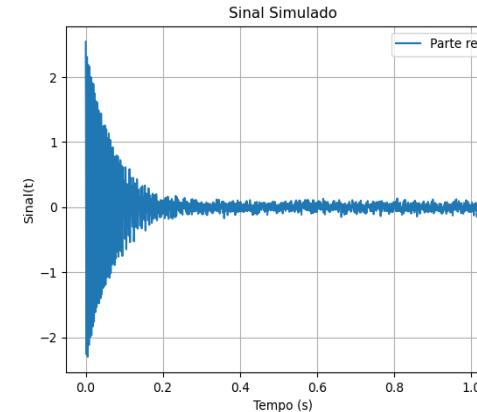
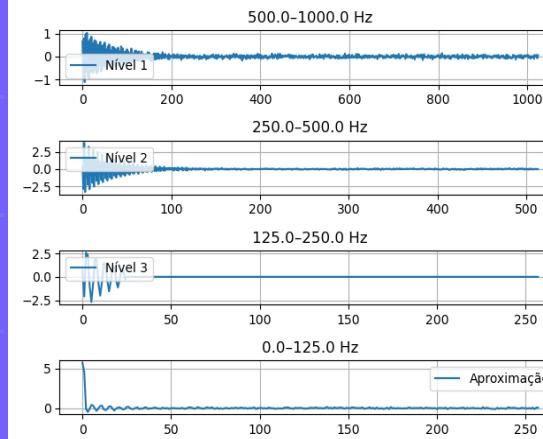
corte

WT

IWT

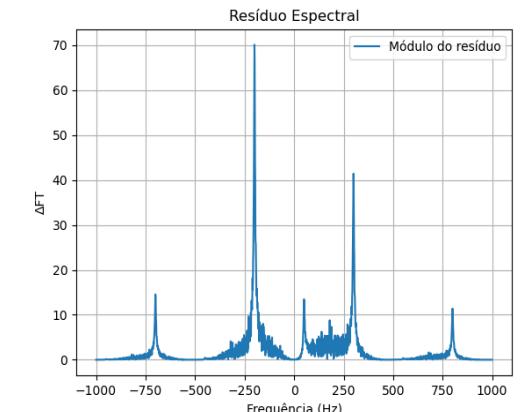
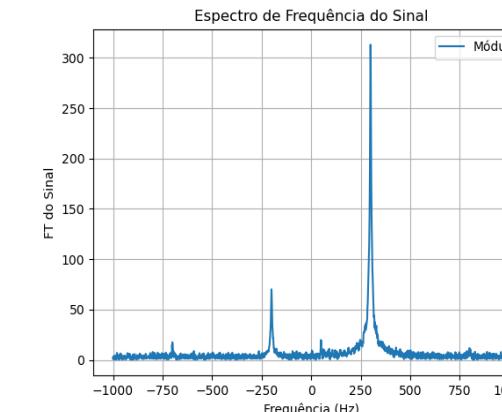
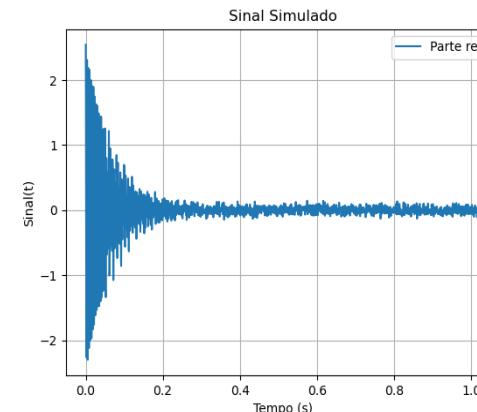
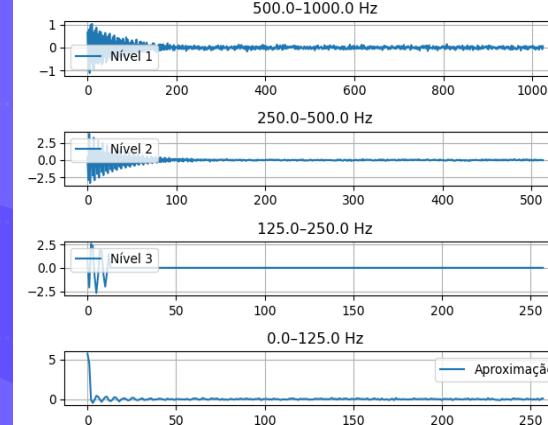
FT

Res



25

13



Filtragem por sym2 em nível único invadindo a área do Sinal B

Nível 3

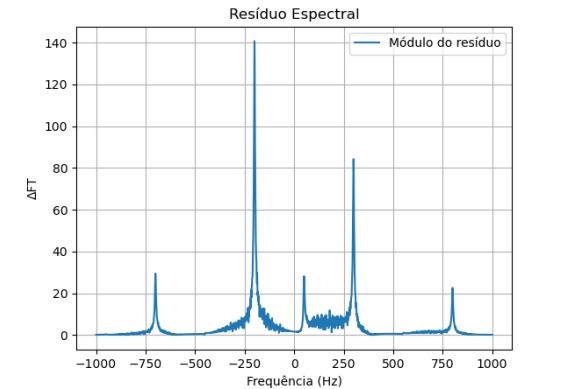
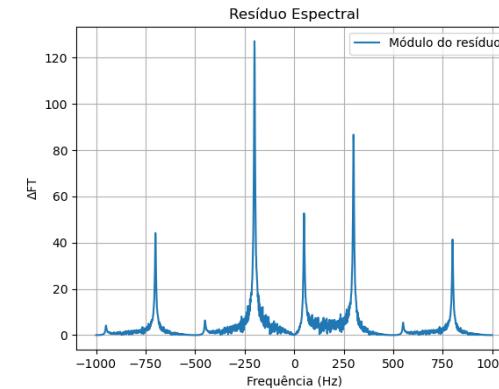
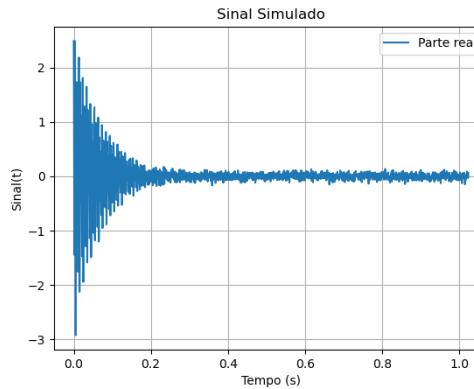
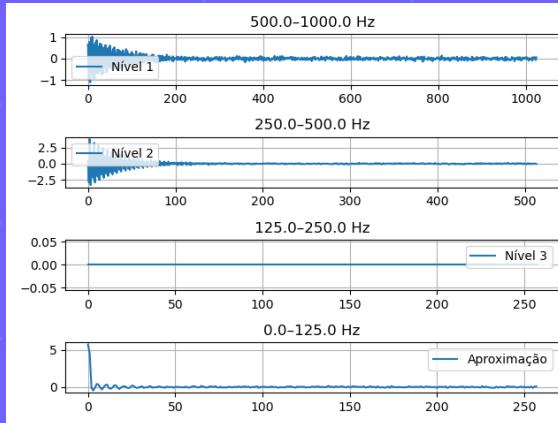
corte

WT

IWT

FT

Res



Filtragem por haar em nível único invadindo a área do Sinal B

Aprox.

corte

50

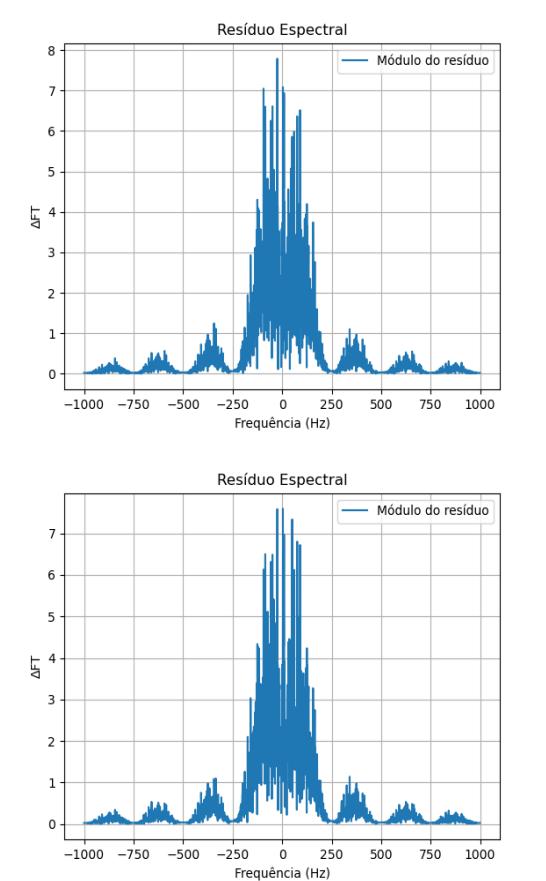
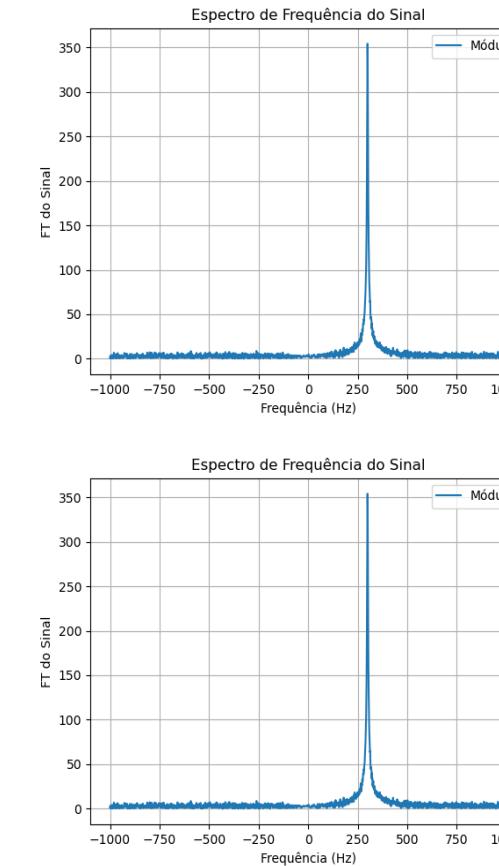
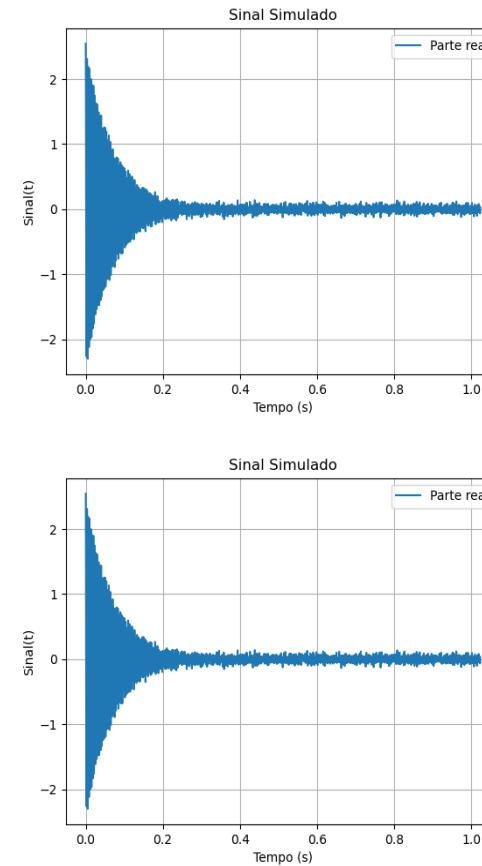
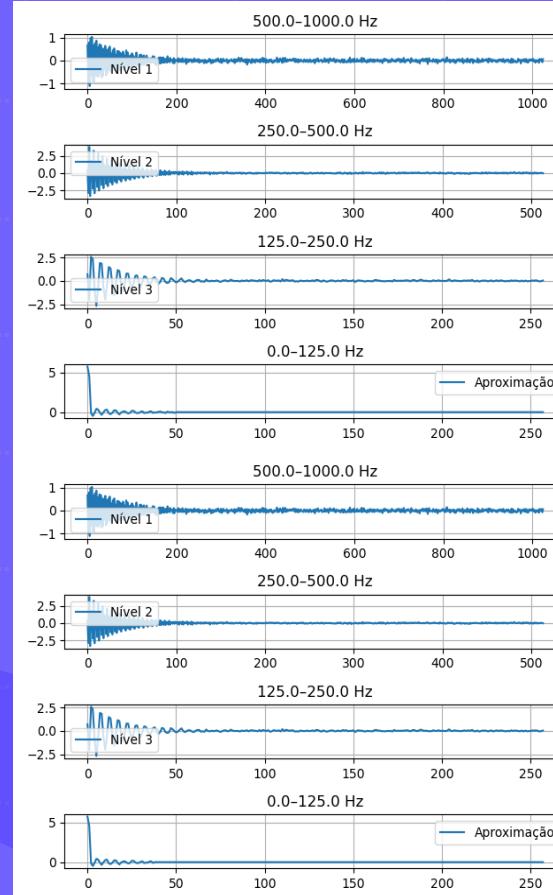
38

WT

IWT

FT

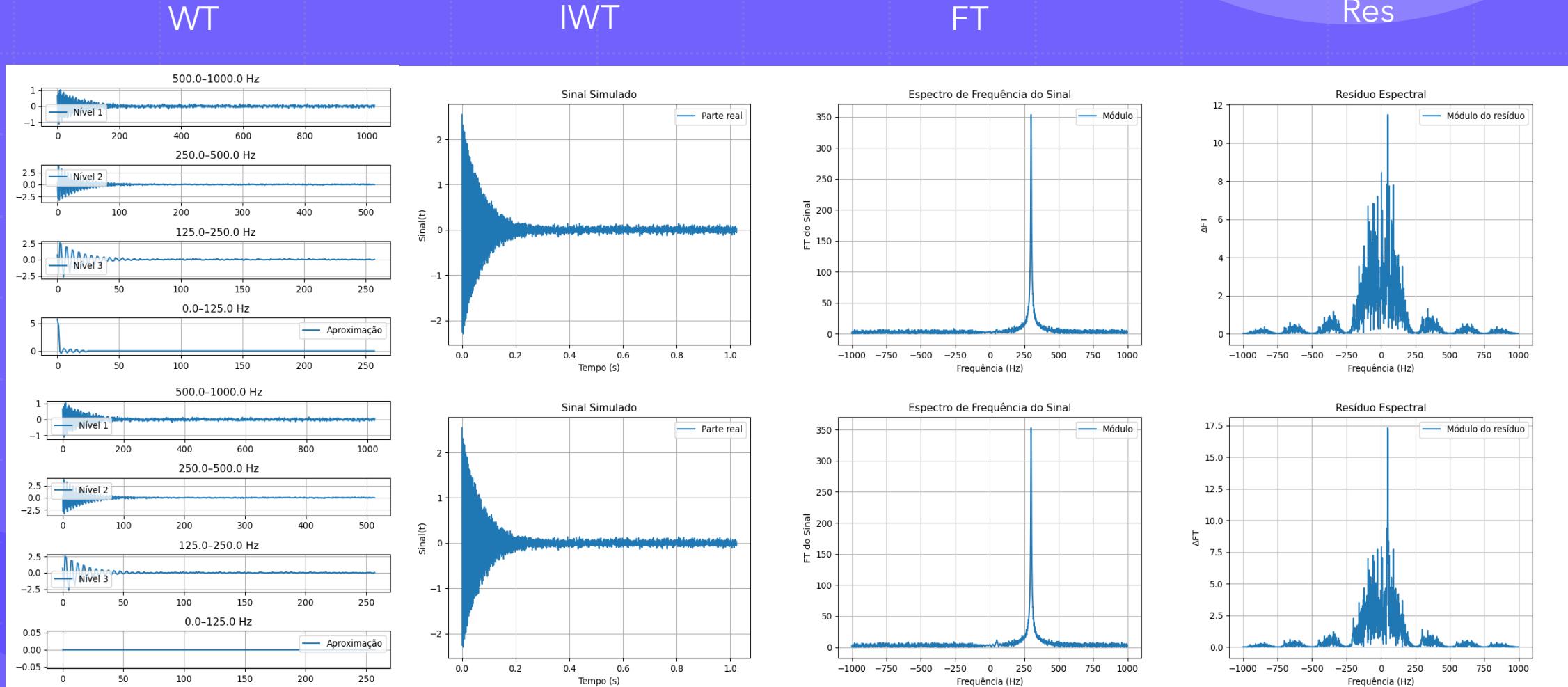
Res



Filtragem por haar em nível único invadindo a área do Sinal B

Aprox.

corte



25

13

Filtragem por haar em nível único invadindo a área do Sinal B

Aprox.

corte

WT

IWT

FT

Res

