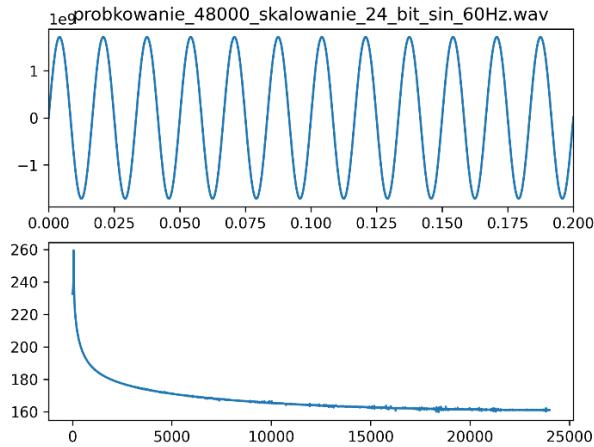


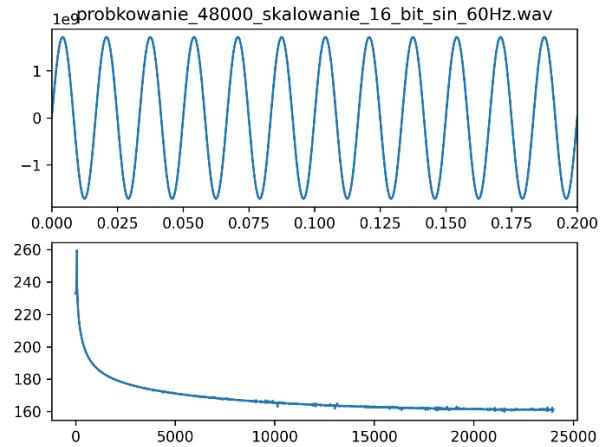
Zmiana rozdzielczości bitowej

Przy 16 bitach dźwięk wydaje się być taki sam jak oryginał, nie usłyszałem żadnych zmian w głośności ani utraty jakości. Nie zauważylem również żadnych anomalii na wykresie widma.

Dźwięk 24bit

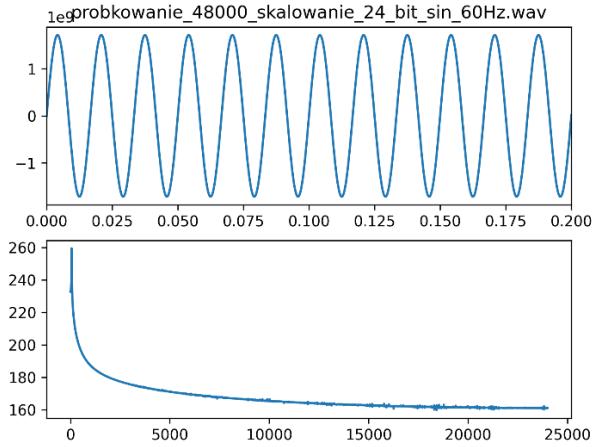


Dźwięk 16bit

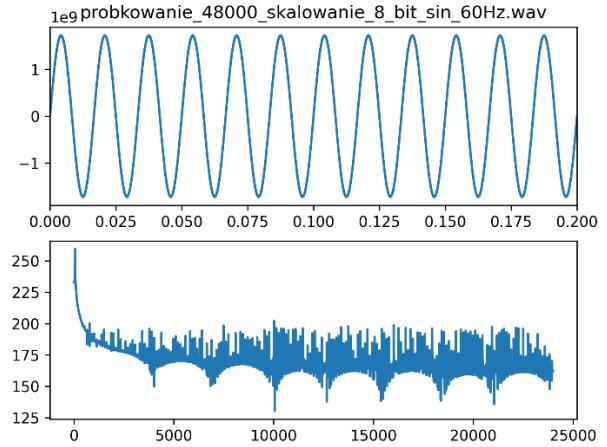


Przy 8 bitach słyszalny był szum oraz dźwięk był mniej przyjemny do odsłuchu. W widmie widzimy dużo różnych częstotliwości.

Dźwięk 24bit

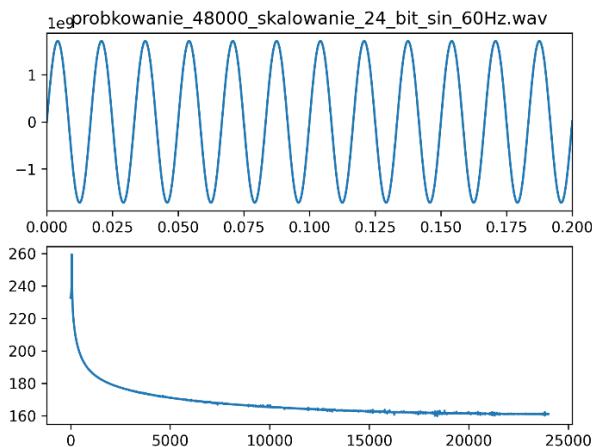


Dźwięk 8bit

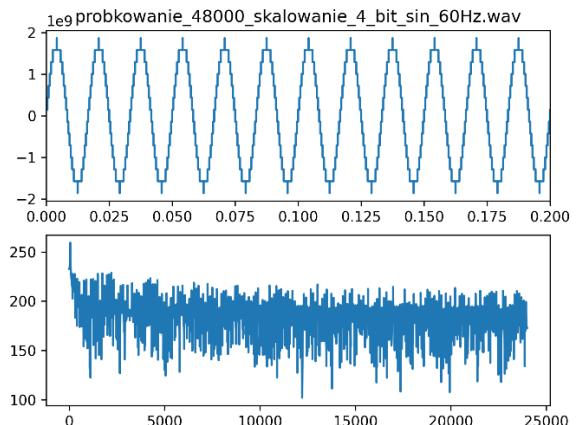


Przy 4 bitach dźwięk jest mocno zniekształcony, głośny i nieprzyjemny w odsłuchu. Wykres widma jest wypełniony częstotliwościami. Widać również progowanie stanów sygnału na wykresie w dziedzinie czasu.

Dźwięk 24bit



Dźwięk 4bit

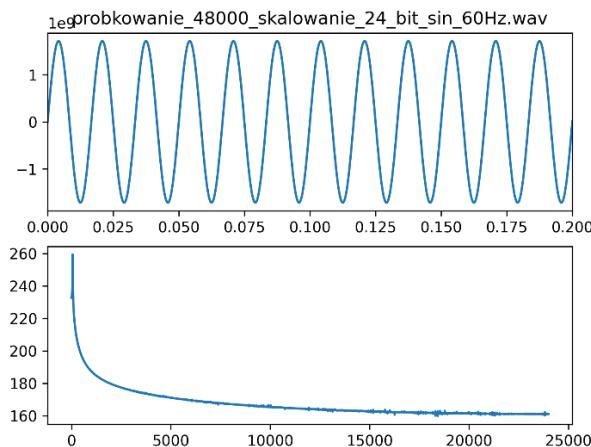


Zmiana częstotliwości próbkowania

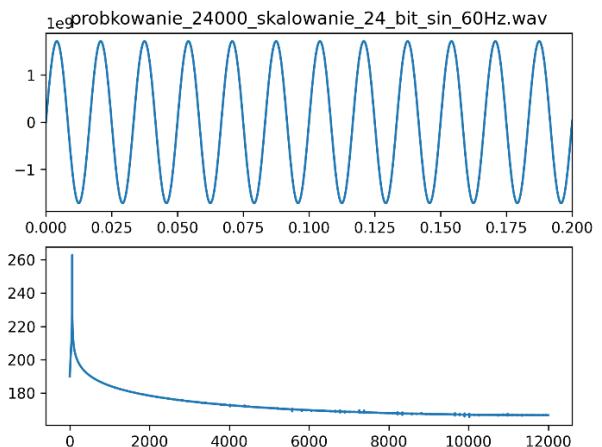
Próbkowanie 41000 Hz nie jest możliwe do wykonania metodą decymacji ponieważ 41 nie dzieli całkowicie 48.

Próbkowanie 24000 Hz, nie usłyszałem różnic w jakości audio miedzy oryginałem a badaną próbką. Wykresy widma są bardzo podobne, wykres dźwięku o niższej częstotliwości próbkowania posiada anomalie przy niskich częstotliwościach.

Dźwięk o próbkowaniu 48000Hz



Dźwięk o próbkowaniu 24000Hz

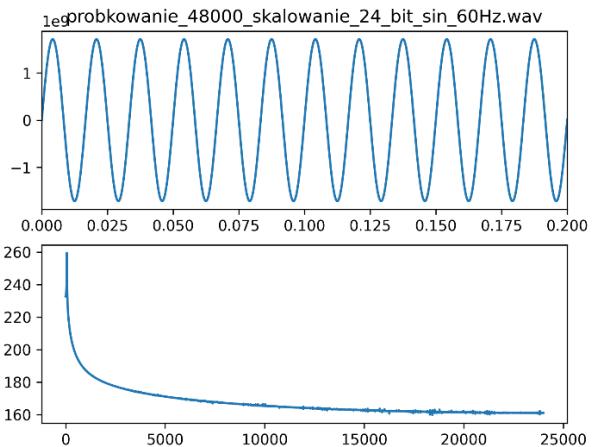


Próbkowanie 16950 Hz

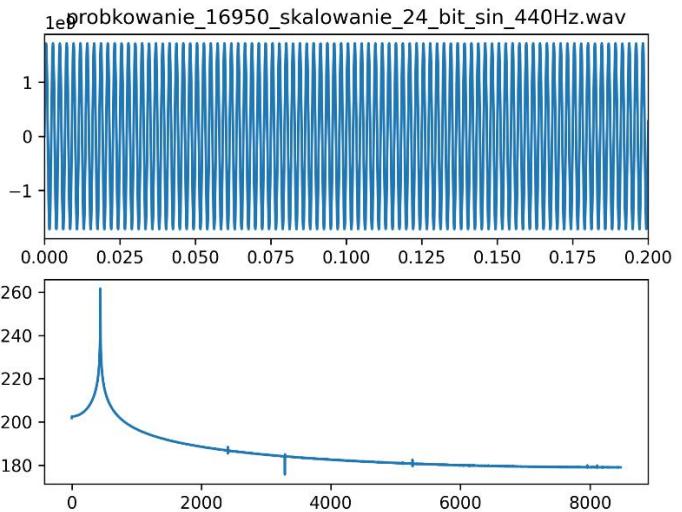
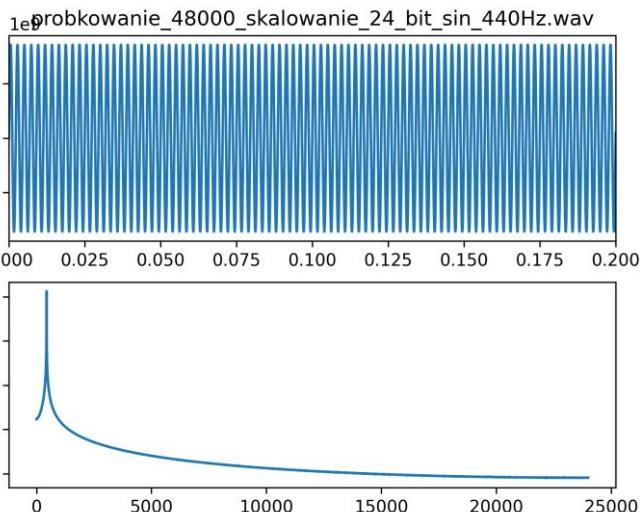
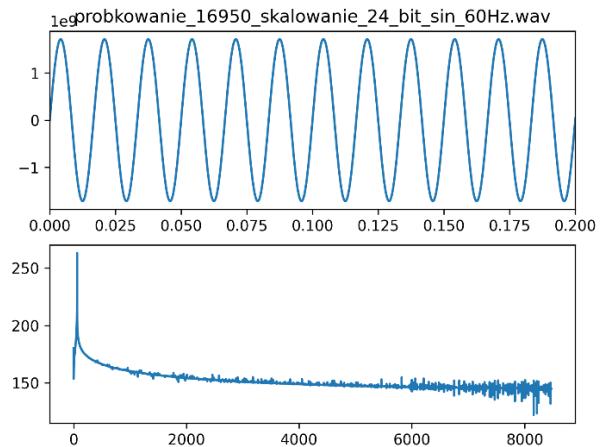
Jest to najmniejsza częstotliwość próbkowania przy której słyszalna jest próbka sin 8000. Jest to wyjaśnione twierdzeniem Nyquista–Shannona.

Przy tym próbkowaniu można usłyszeć utratę jakości audio. Dźwięk nie jest tak klarowny jak oryginalny, największe różnice można usłyszeć w plikach sing_high1 i sing_high2, najmniej słyszalne różnice są w plikach sing_low1 i sing_low2.

Dźwięk o próbkowaniu 48000Hz



Dźwięk o próbkowaniu 16950Hz

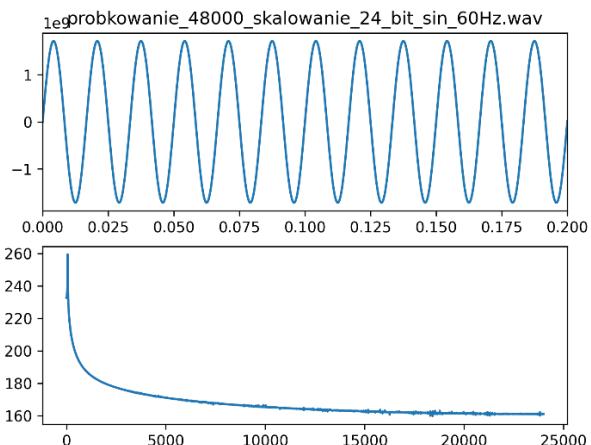


Próbkowanie 16000 Hz ma bardzo podobne efekty jak próbkowanie 16950 Hz.

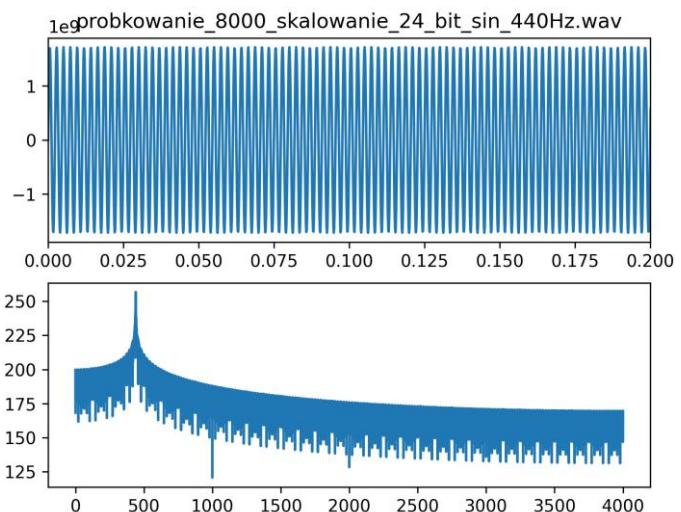
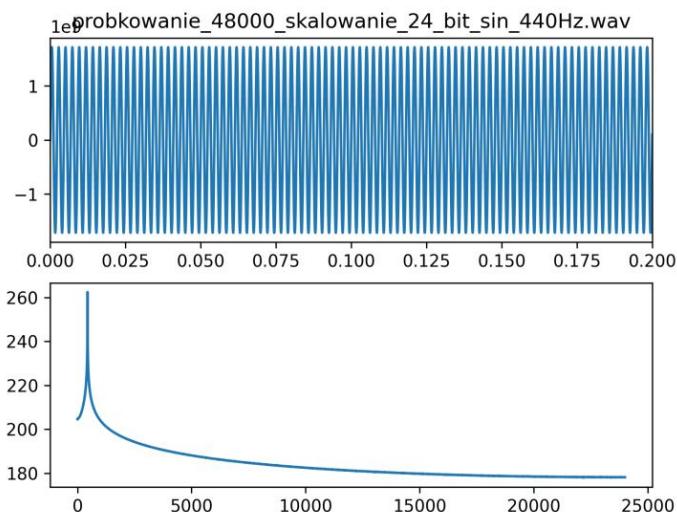
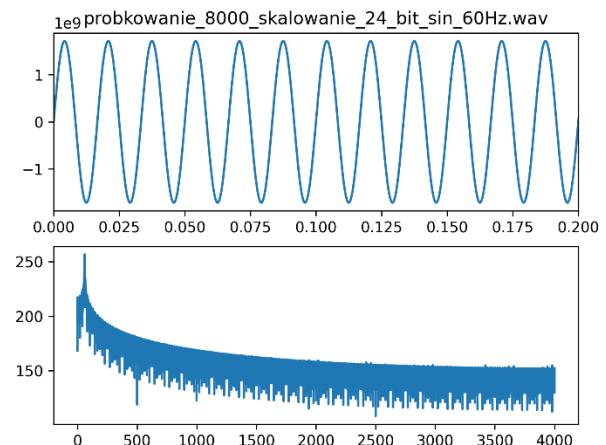
Próbkowanie 8000 Hz

Przy tym próbkowaniu, utrata jakości jest jasno słyszalna, dźwięk wydaje się stłumiony przy jednoczesnym zachowaniu głośności, można usłyszeć różne artefakty.

Dźwięk o próbkowaniu 48000Hz



Dźwięk o próbkowaniu 8000Hz



Przy mniejszych częstotliwościach zniekształcenia są jeszcze bardziej słyszalne.

Pliki sing_high są praktycznie nie do rozpoznania a w plikach medium i low jeszcze można rozróżnić elementy śpiewu.

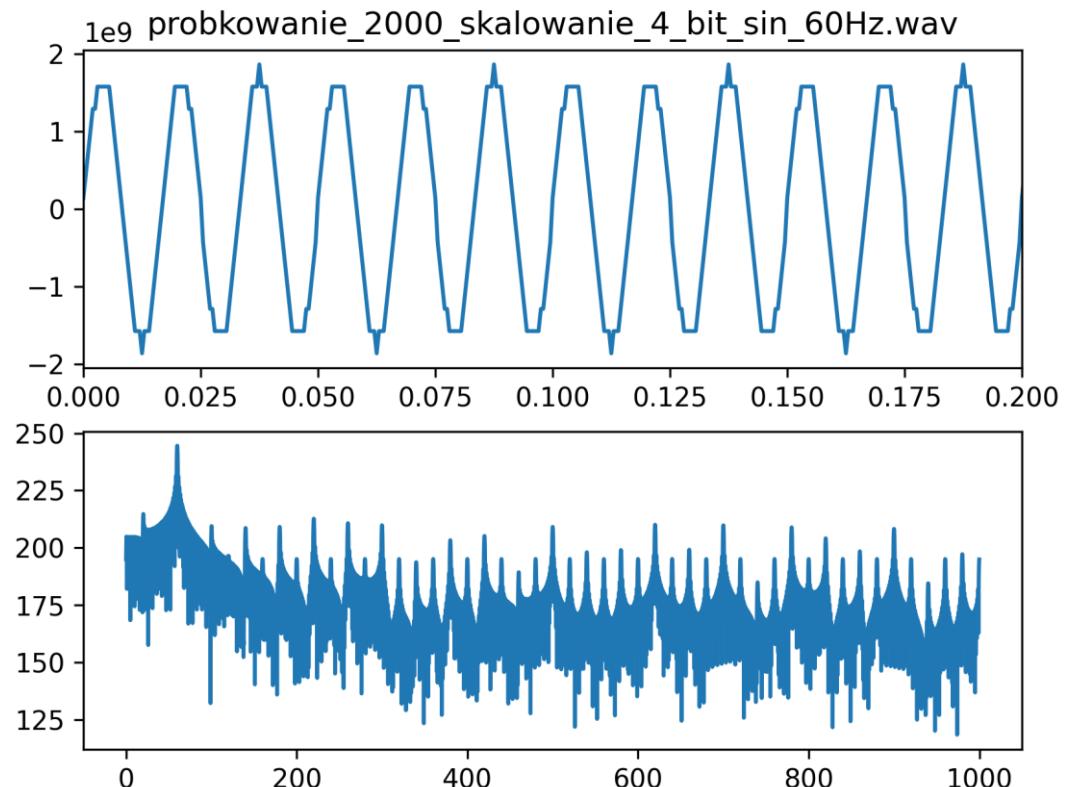
Wnioski

Wraz ze spadkiem częstotliwości próbkowania spada zdolność reprodukcji wyższych dźwięków.

Wraz ze spadkiem rozdzielczości bitowej spada ilość możliwych poziomów głośności.

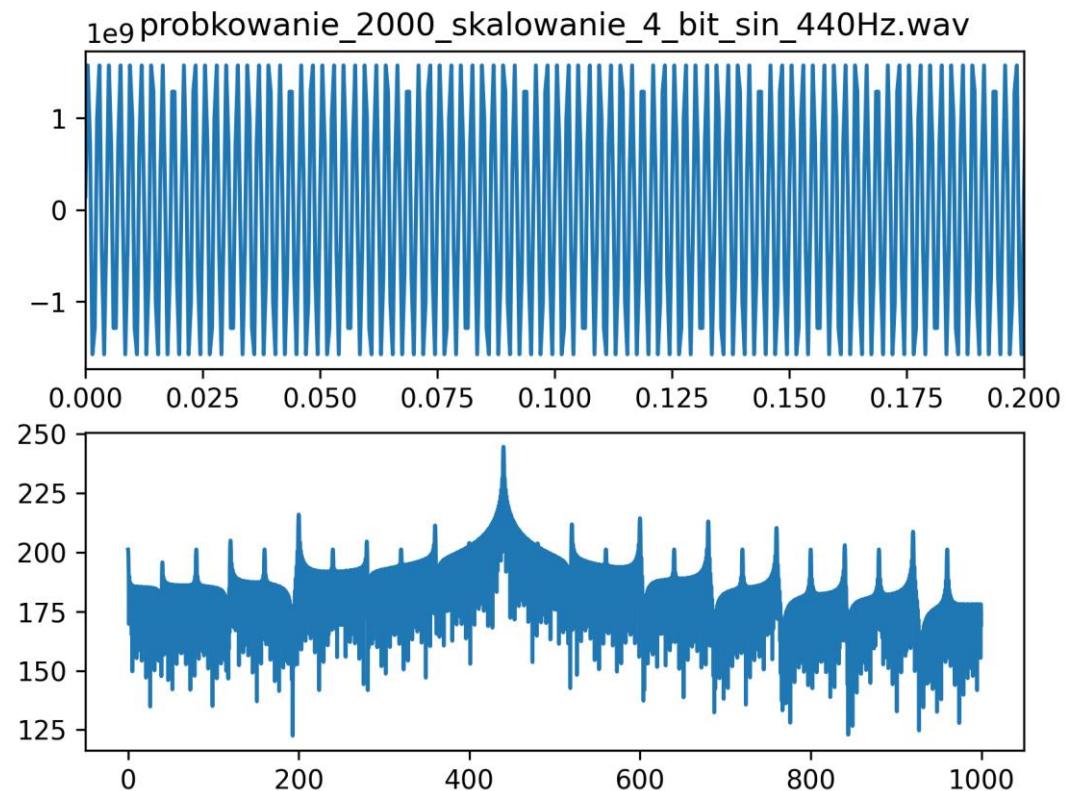
Ratańczuk Sebastian rs44476

gr321



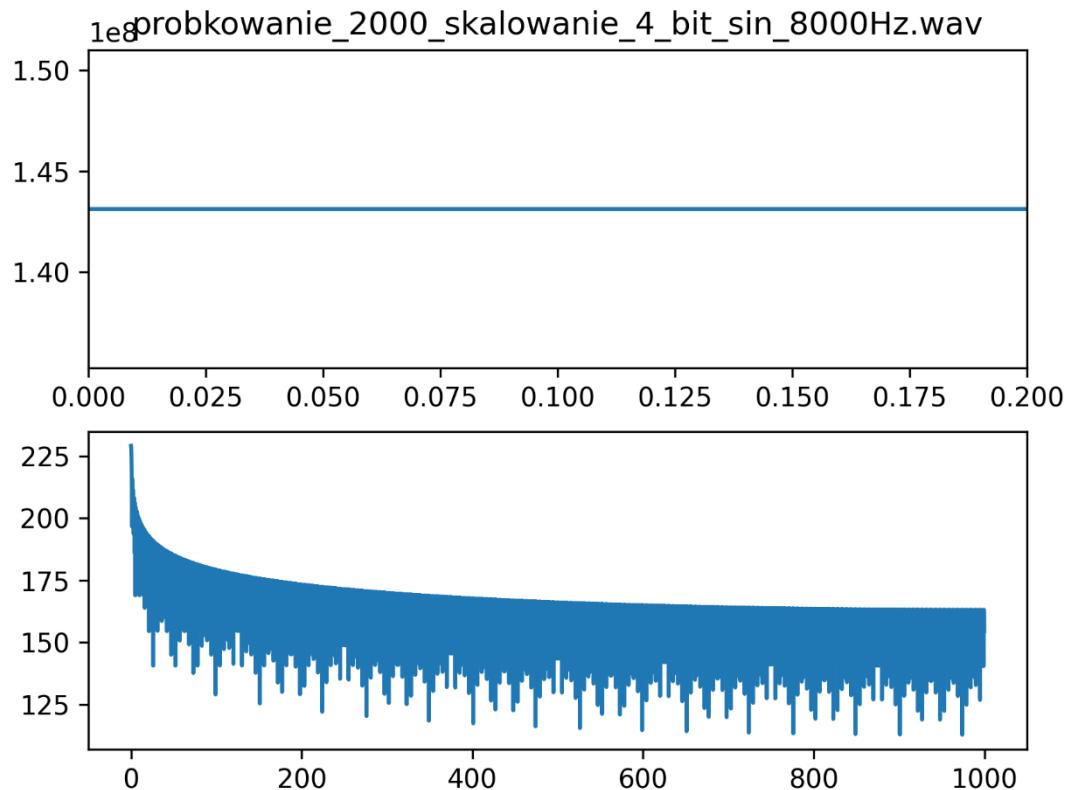
Ratańczuk Sebastian rs44476

gr321



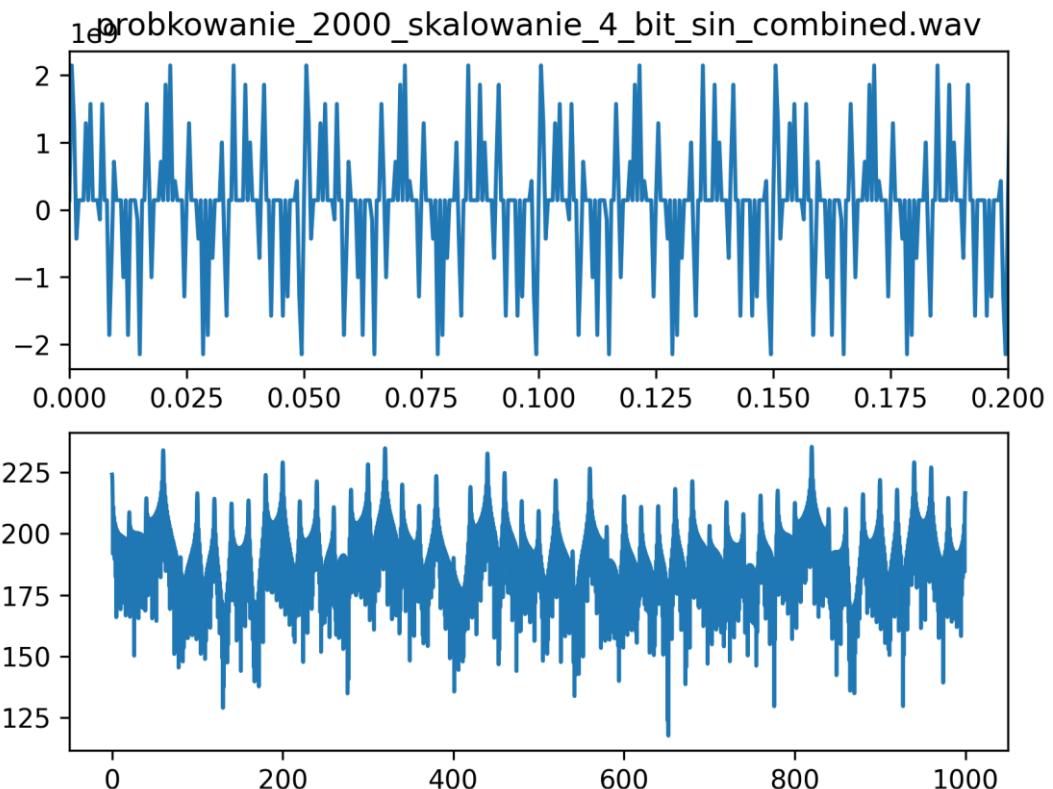
Ratańczuk Sebastian rs44476

gr321



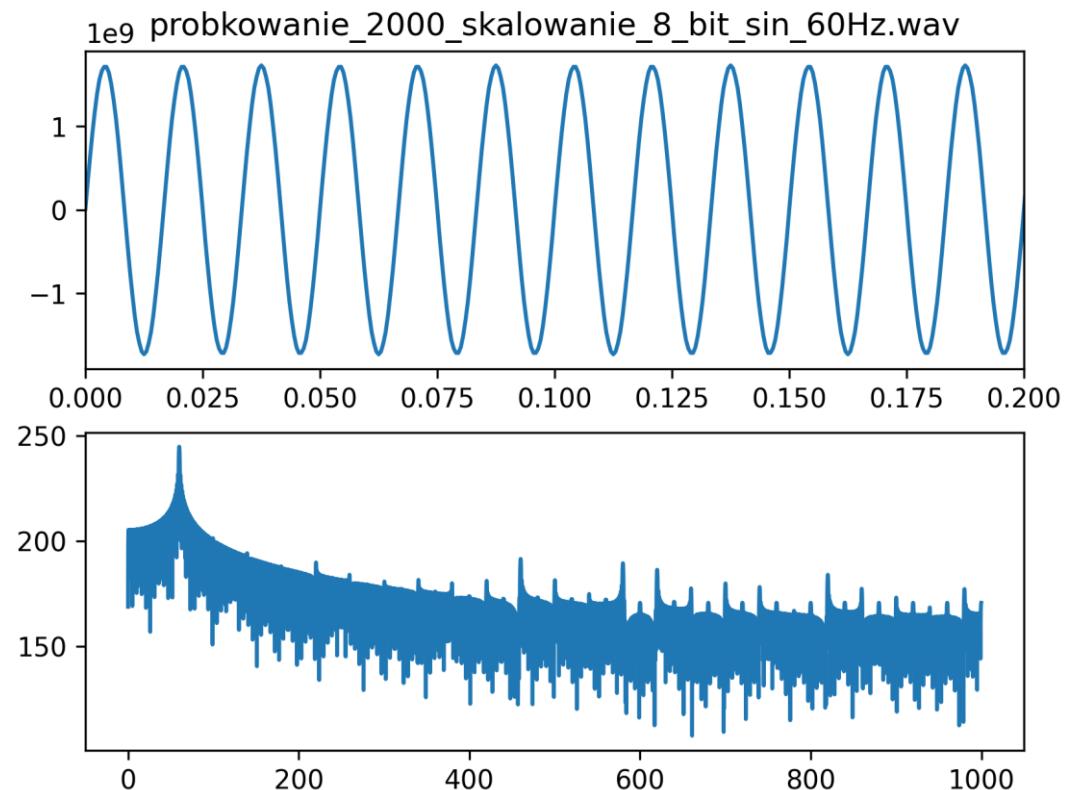
Ratańczuk Sebastian rs44476

gr321



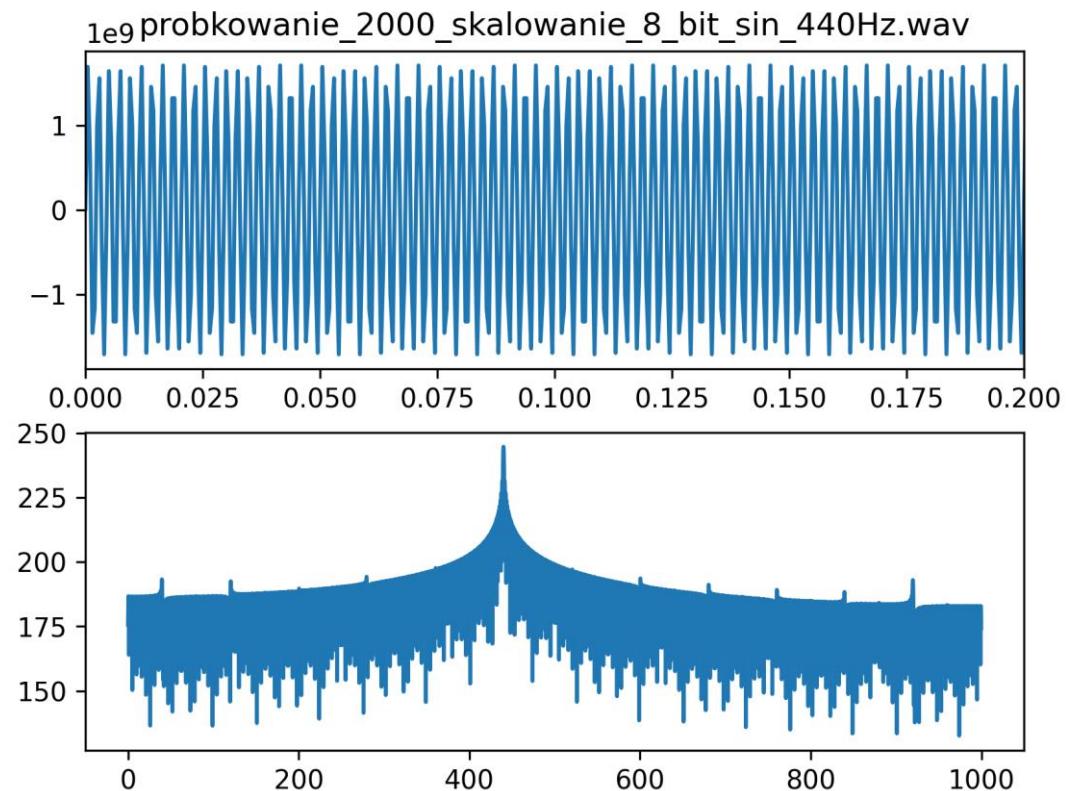
Ratańczuk Sebastian rs44476

gr321



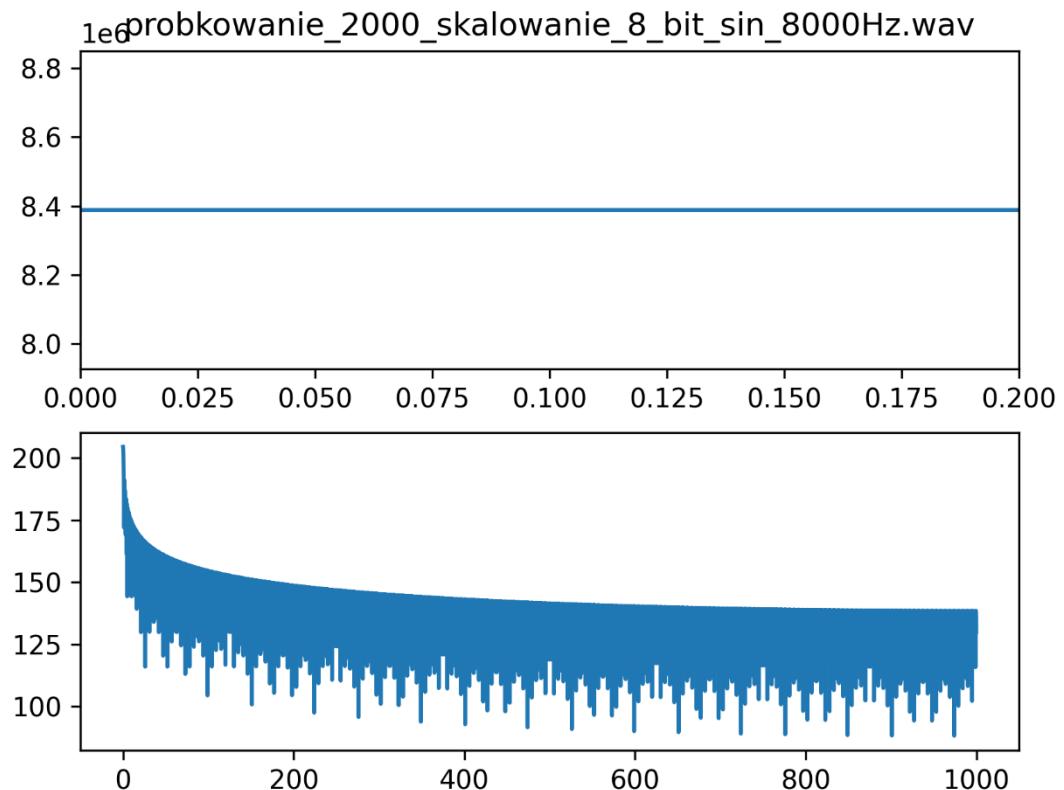
Ratańczuk Sebastian rs44476

gr321



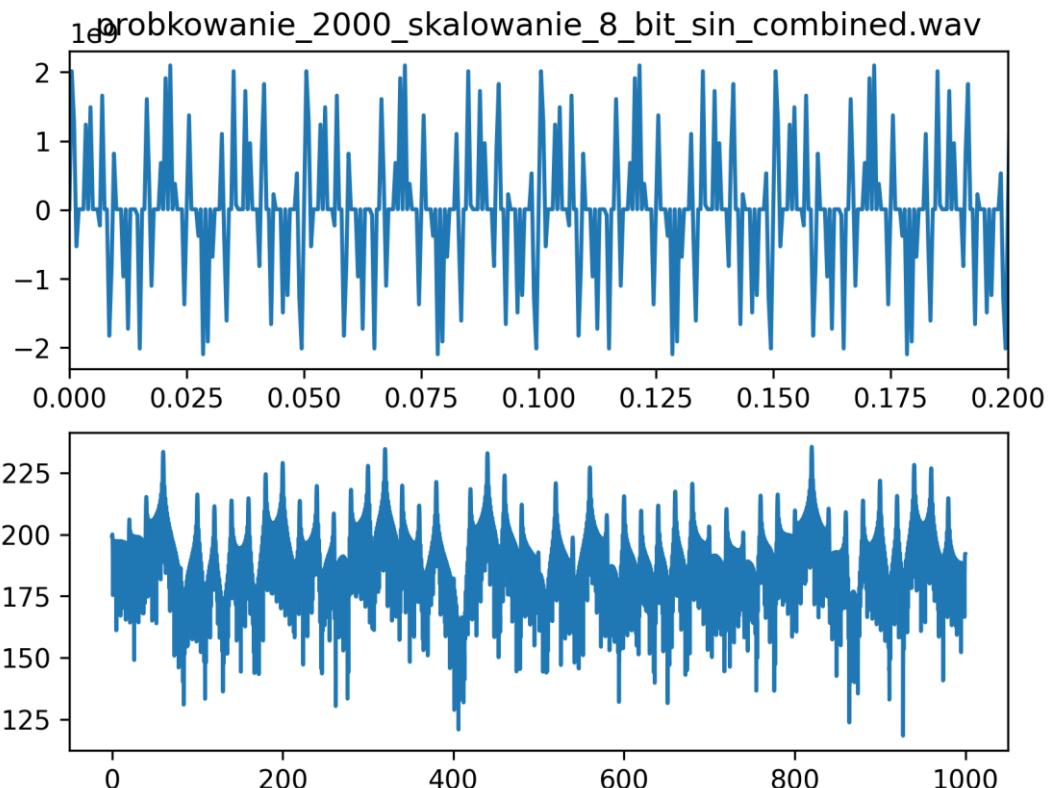
Ratańczuk Sebastian rs44476

gr321



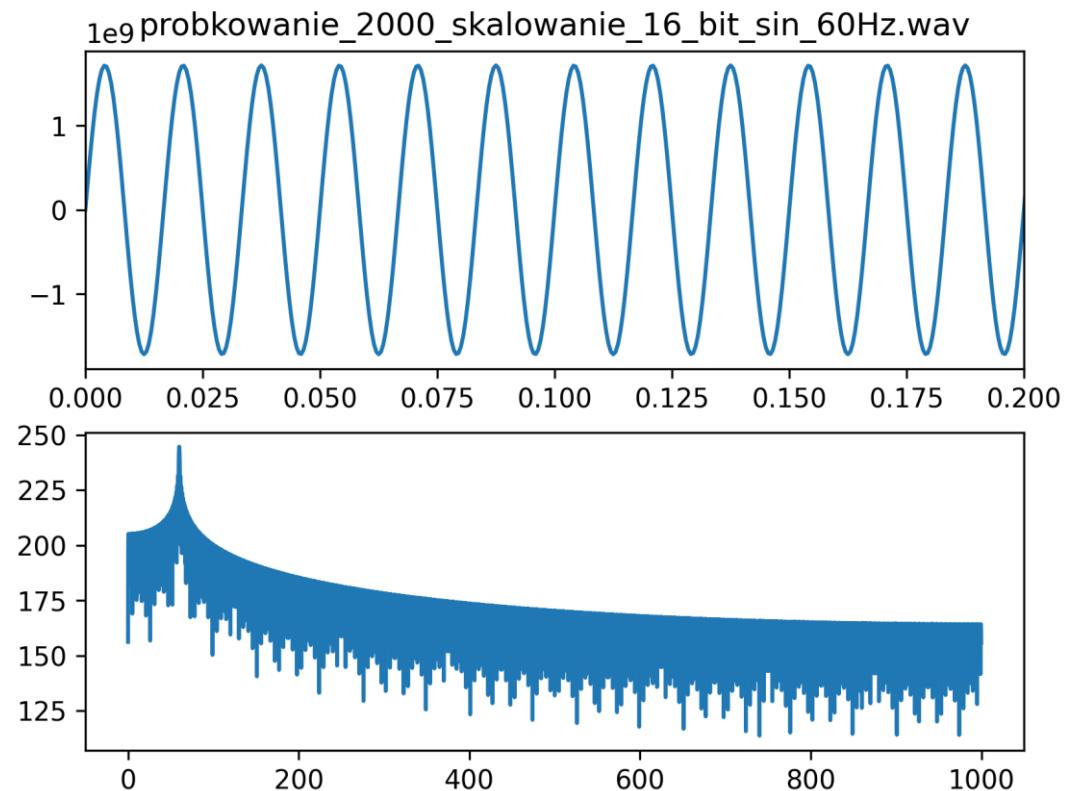
Ratańczuk Sebastian rs44476

gr321



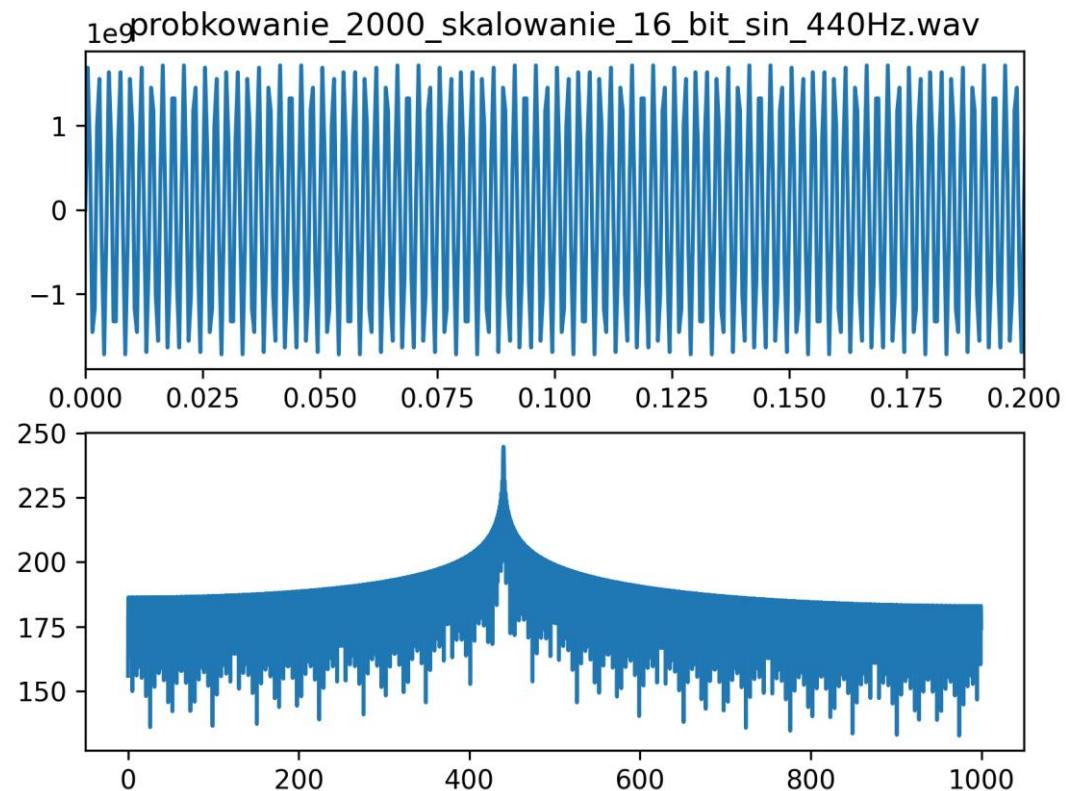
Ratańczuk Sebastian rs44476

gr321



Ratańczuk Sebastian rs44476

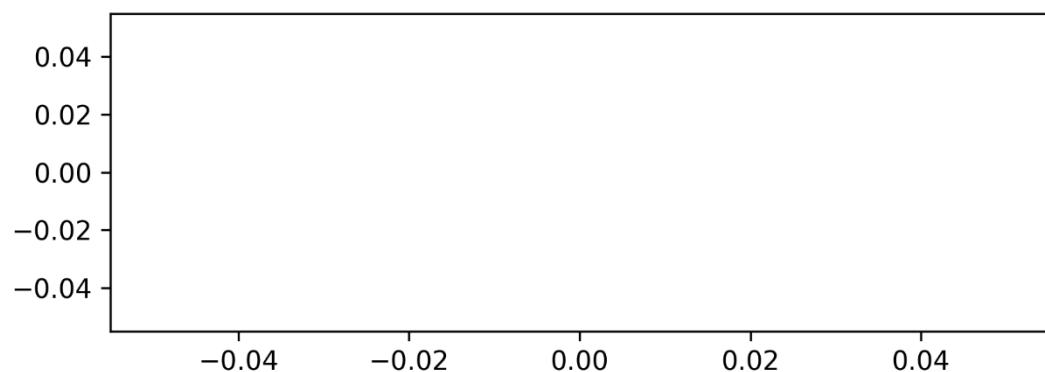
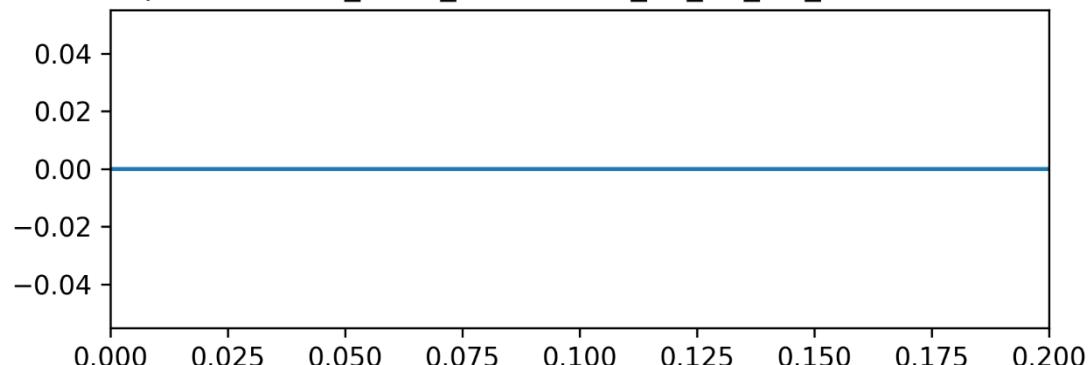
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Ratańczuk Sebastian rs44476

gr321

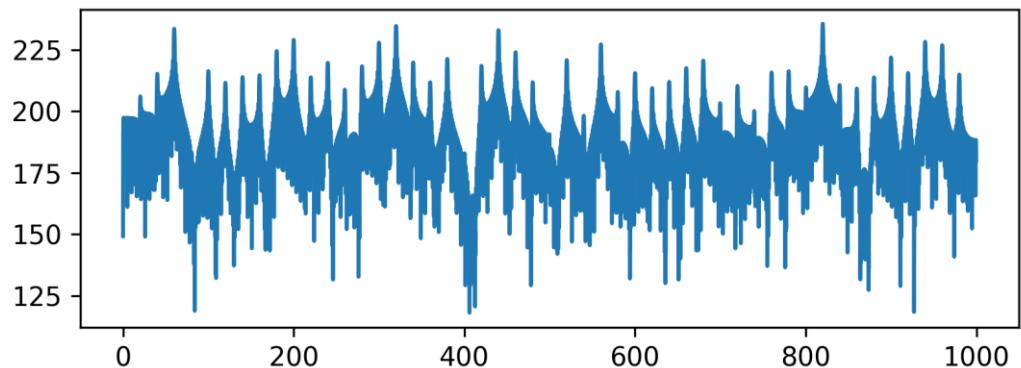
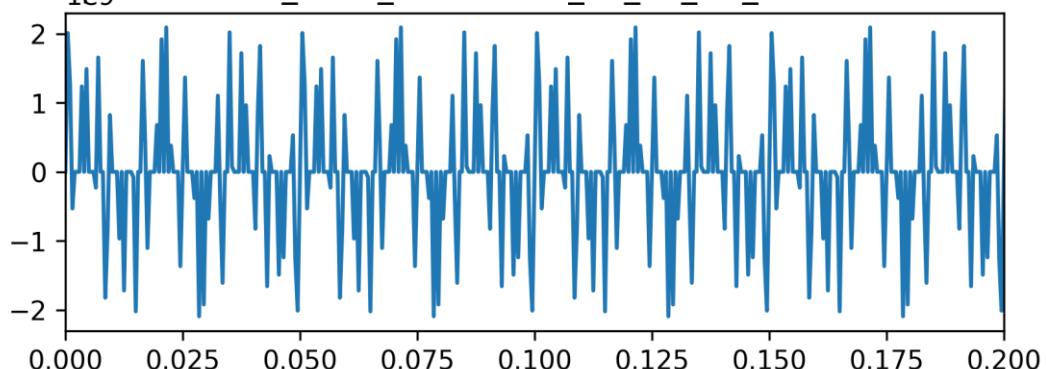
probkowanie_2000_skalowanie_16_bit_sin_8000Hz.wav



Ratańczuk Sebastian rs44476

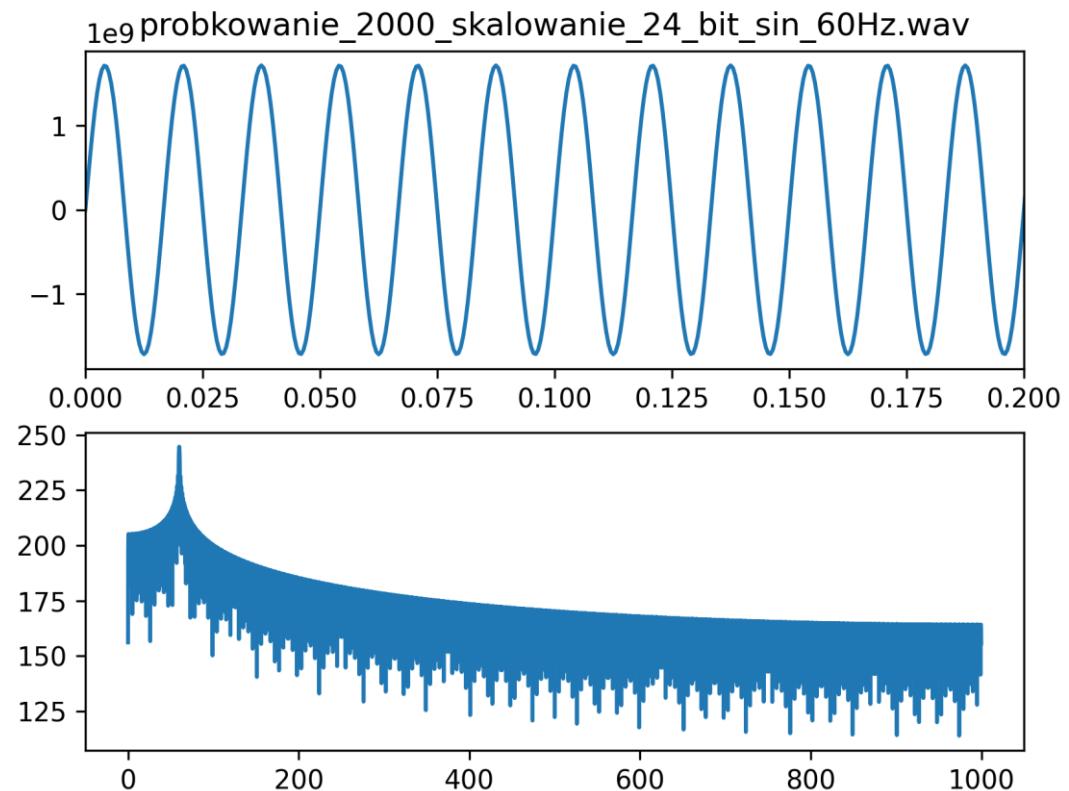
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próbkowanie_2000_skalowanie_16_bit_sin_combined.wav



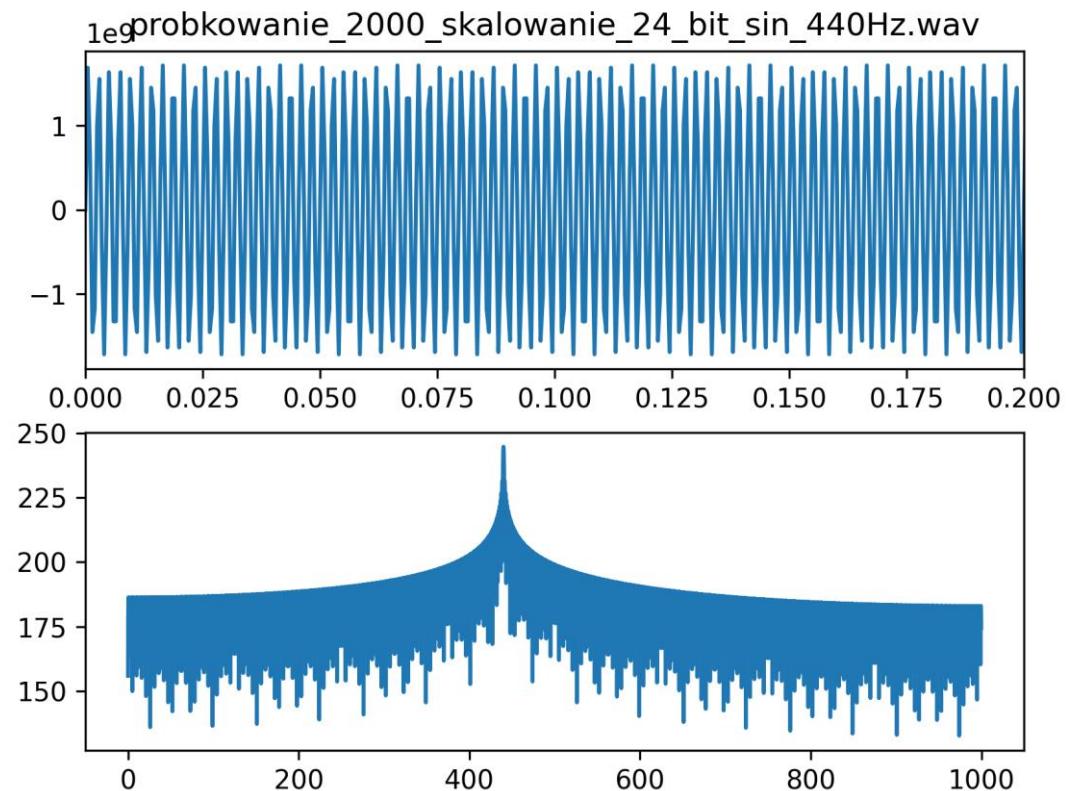
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gr321



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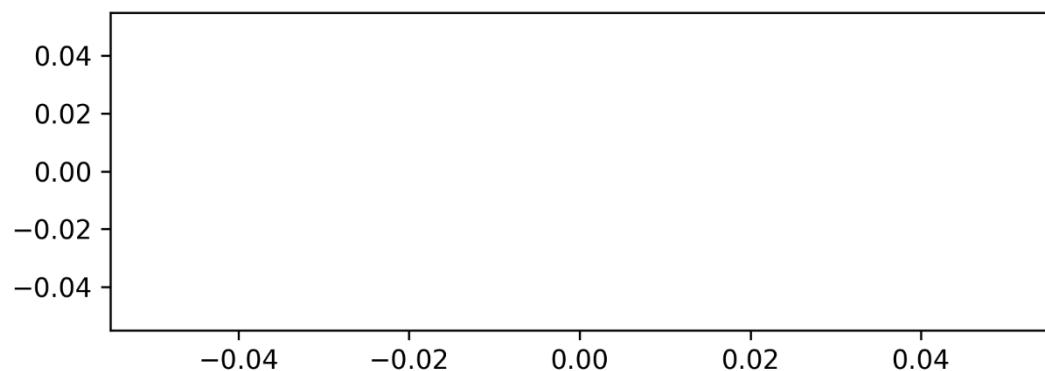
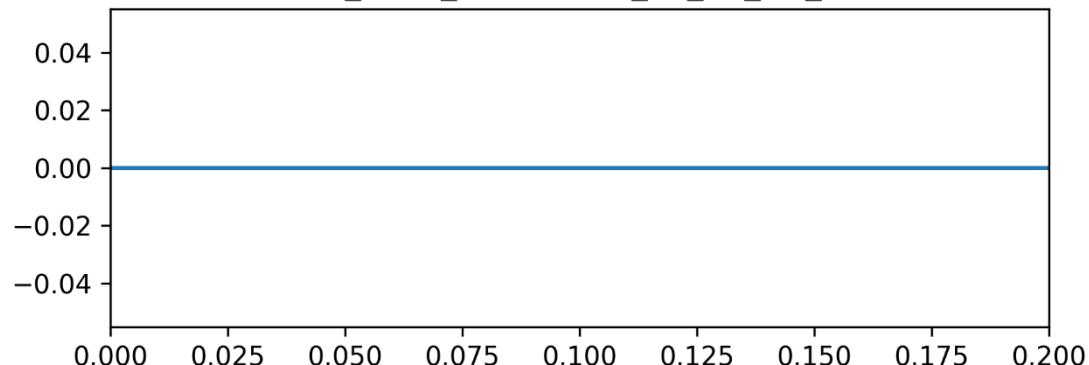
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Ratańczuk Sebastian rs44476

gr321

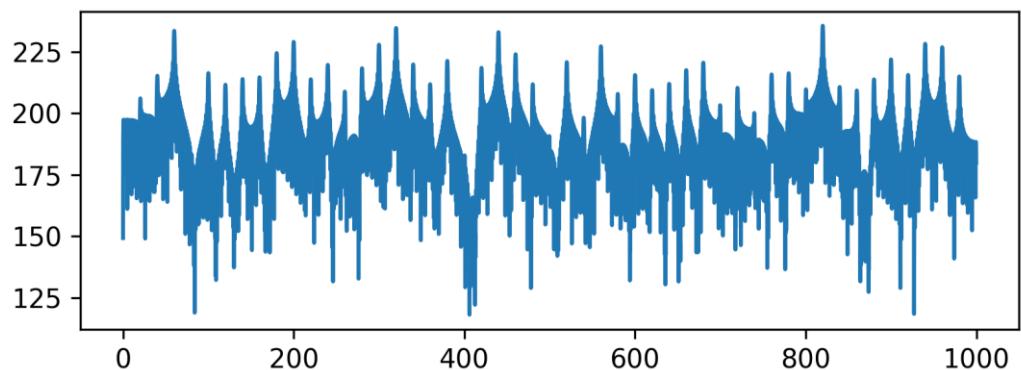
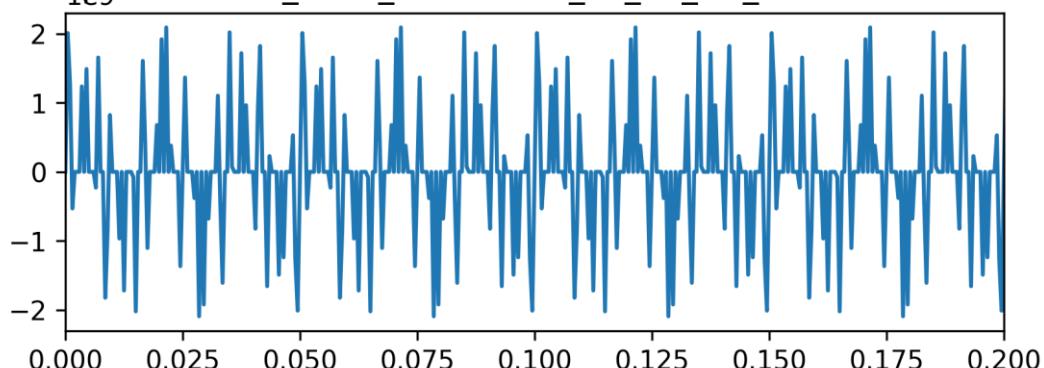
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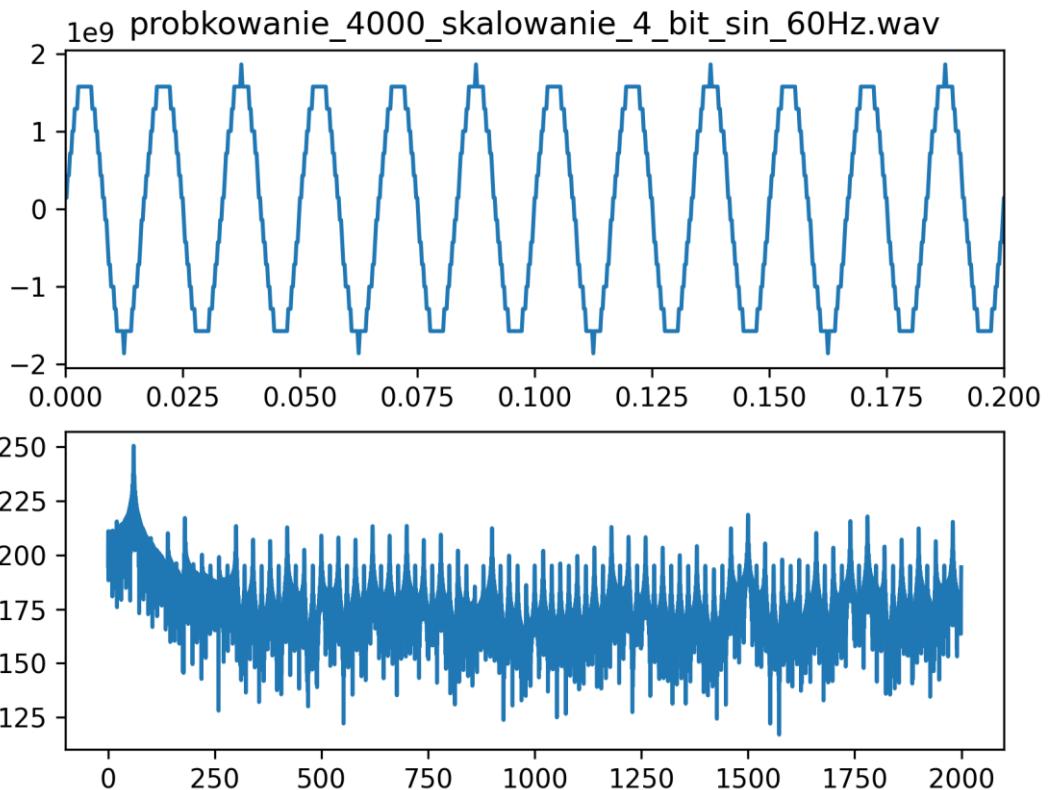
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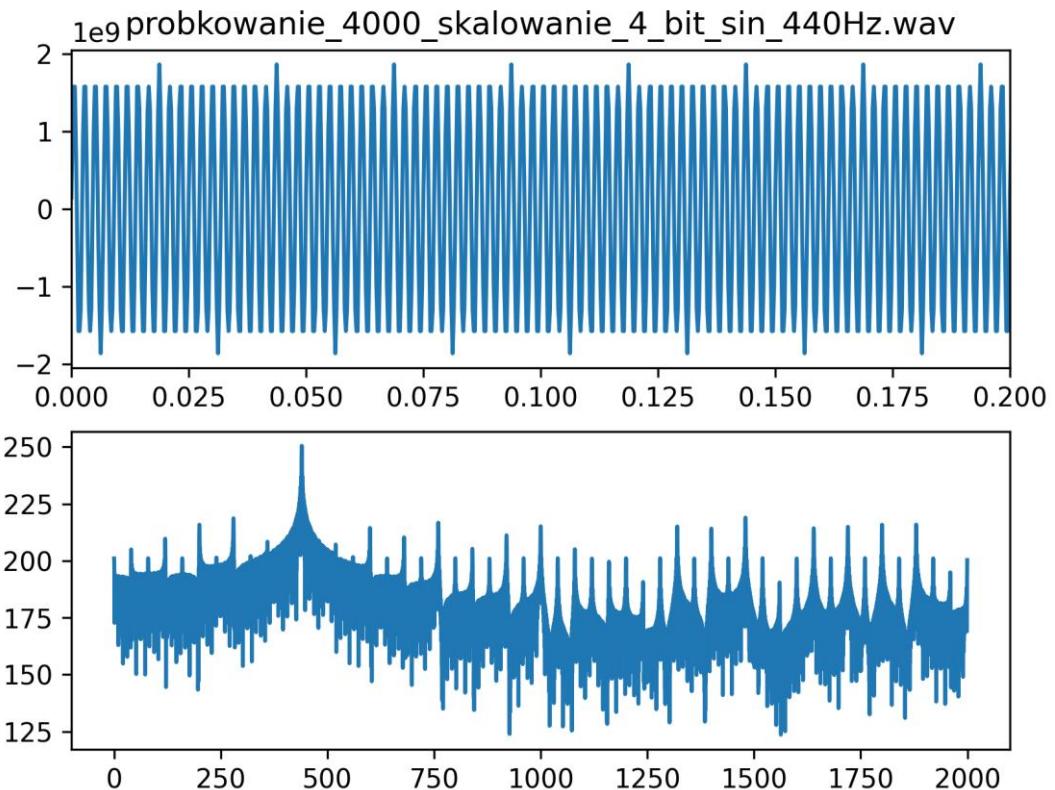
Ratańczuk Sebastian rs44476

gr321



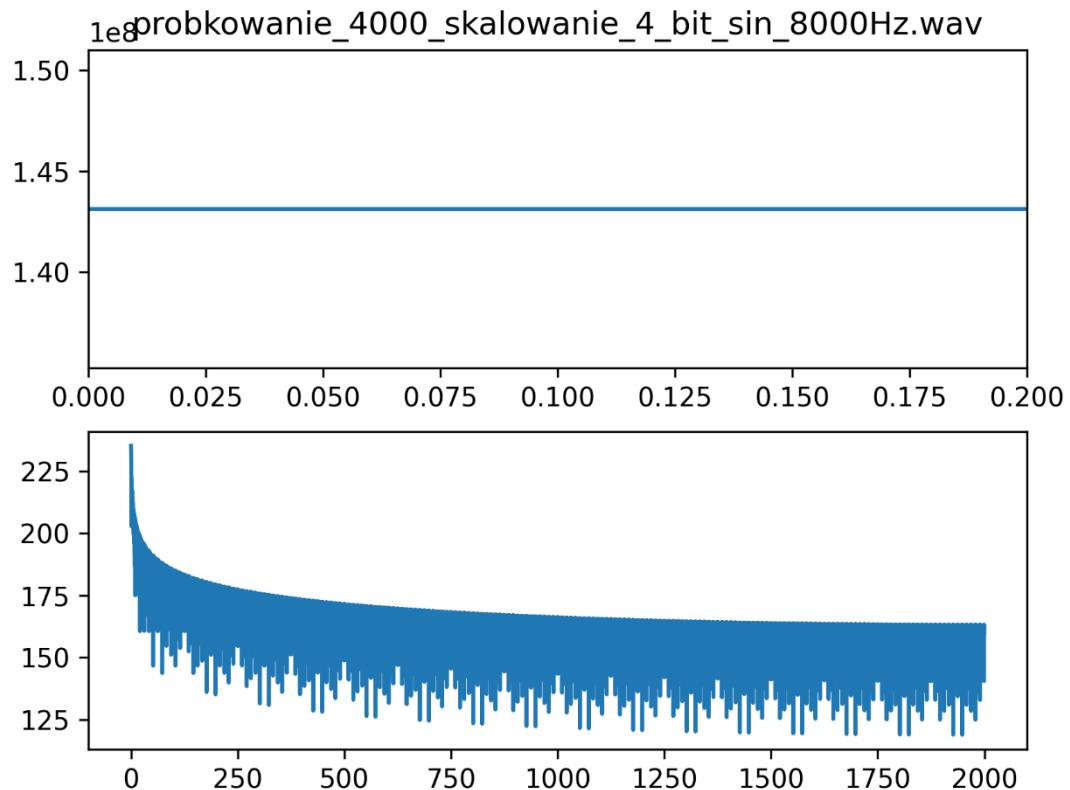
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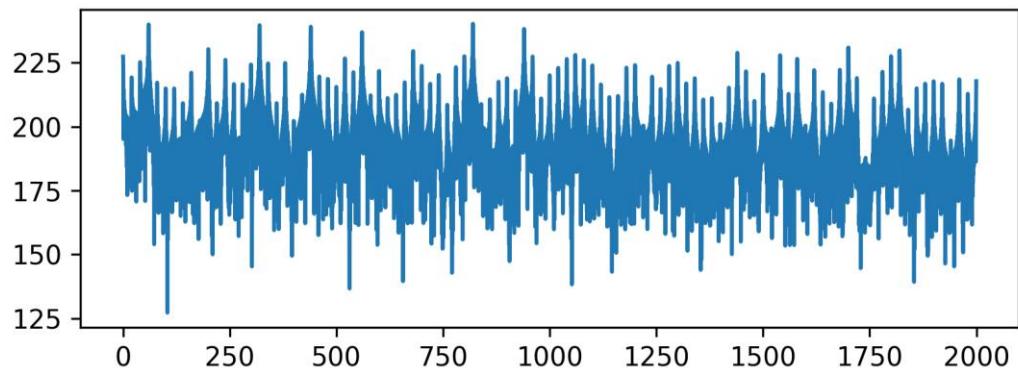
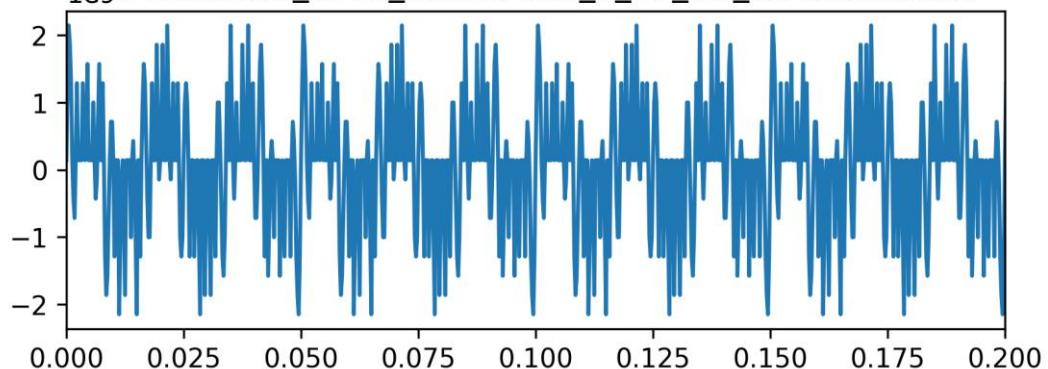
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Ratańczuk Sebastian rs44476

gr321

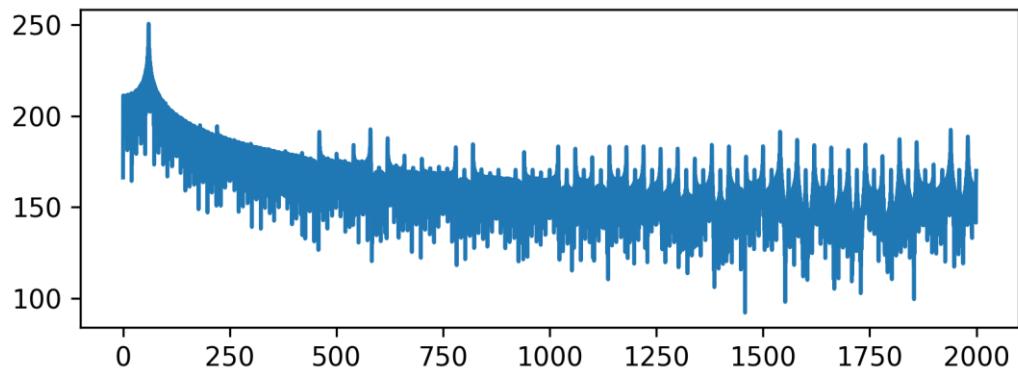
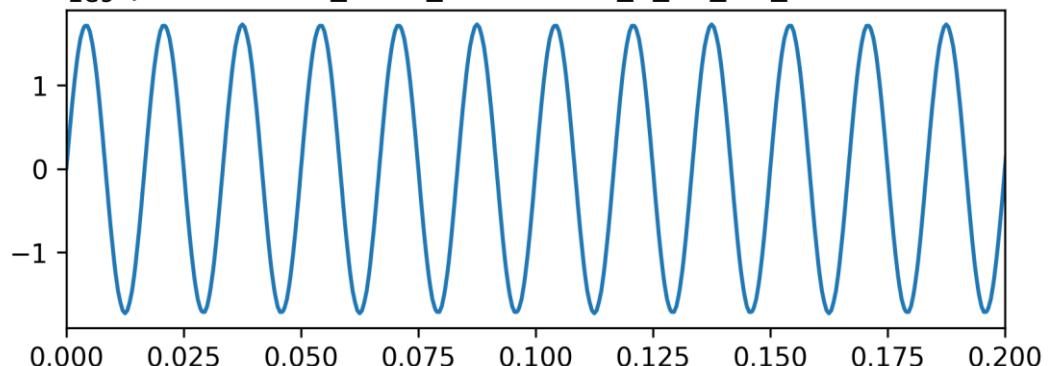
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Ratańczuk Sebastian rs44476

gr321

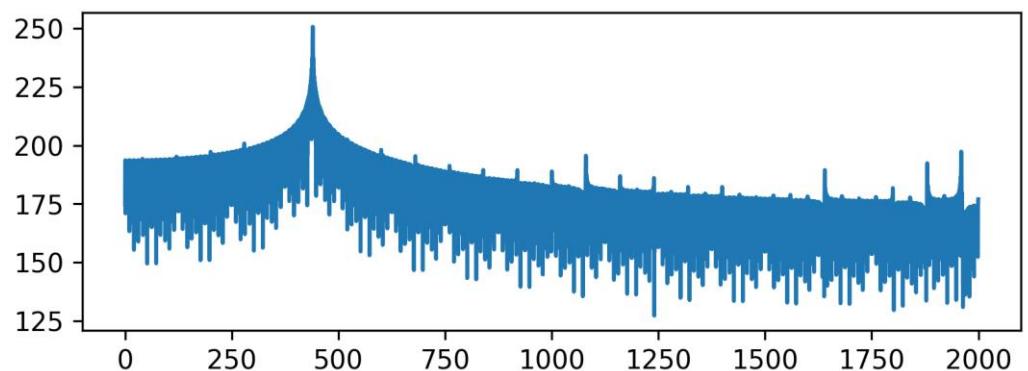
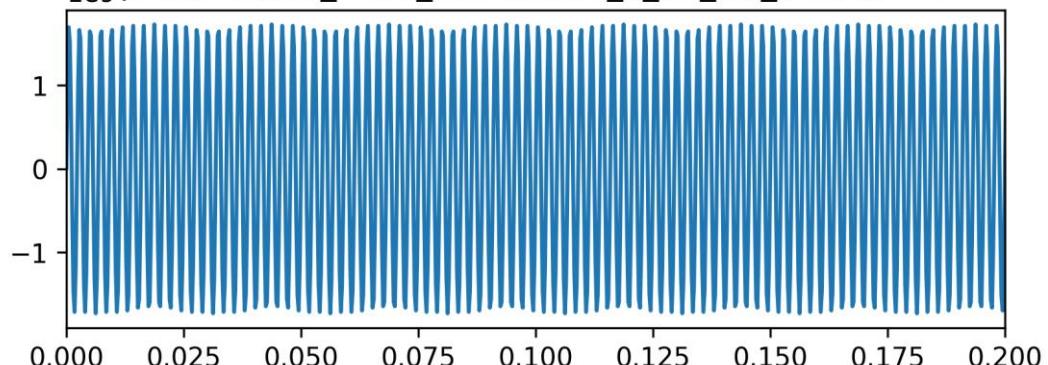
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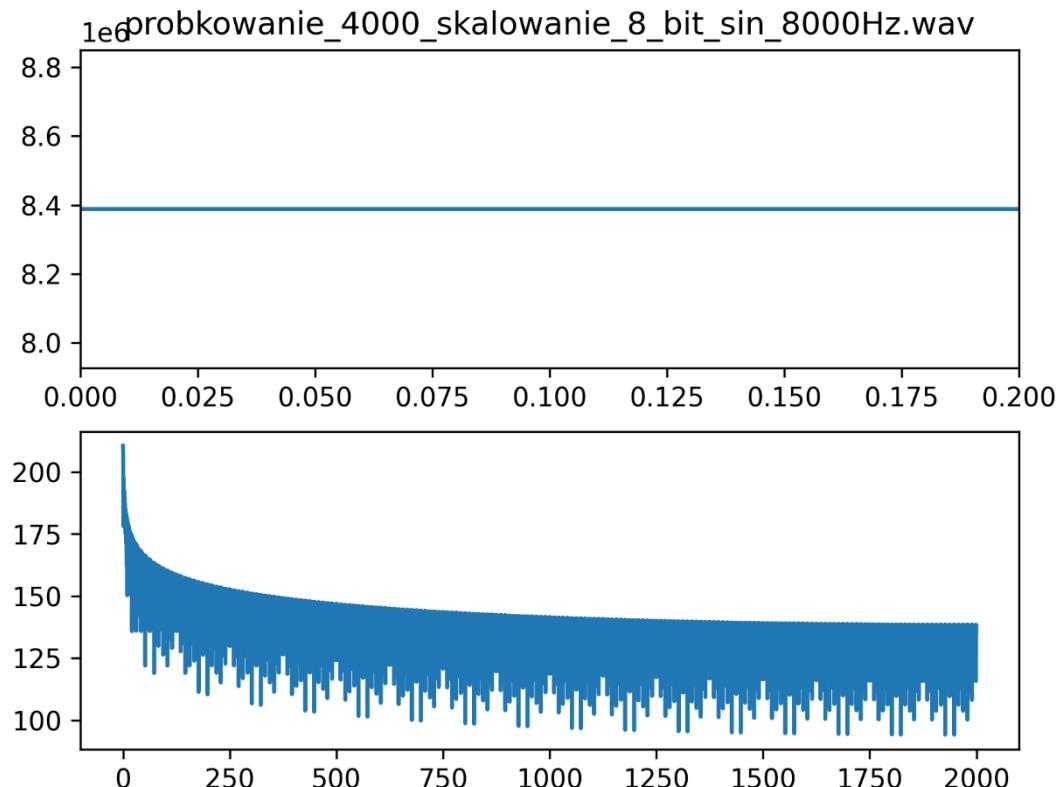
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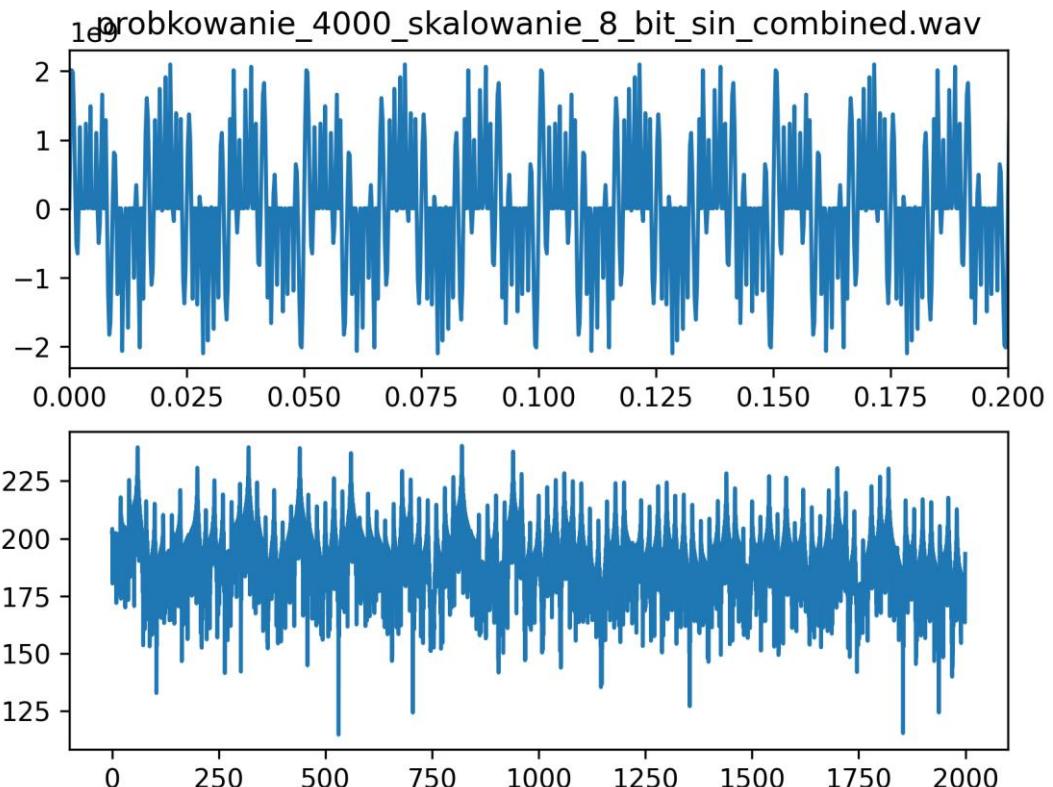
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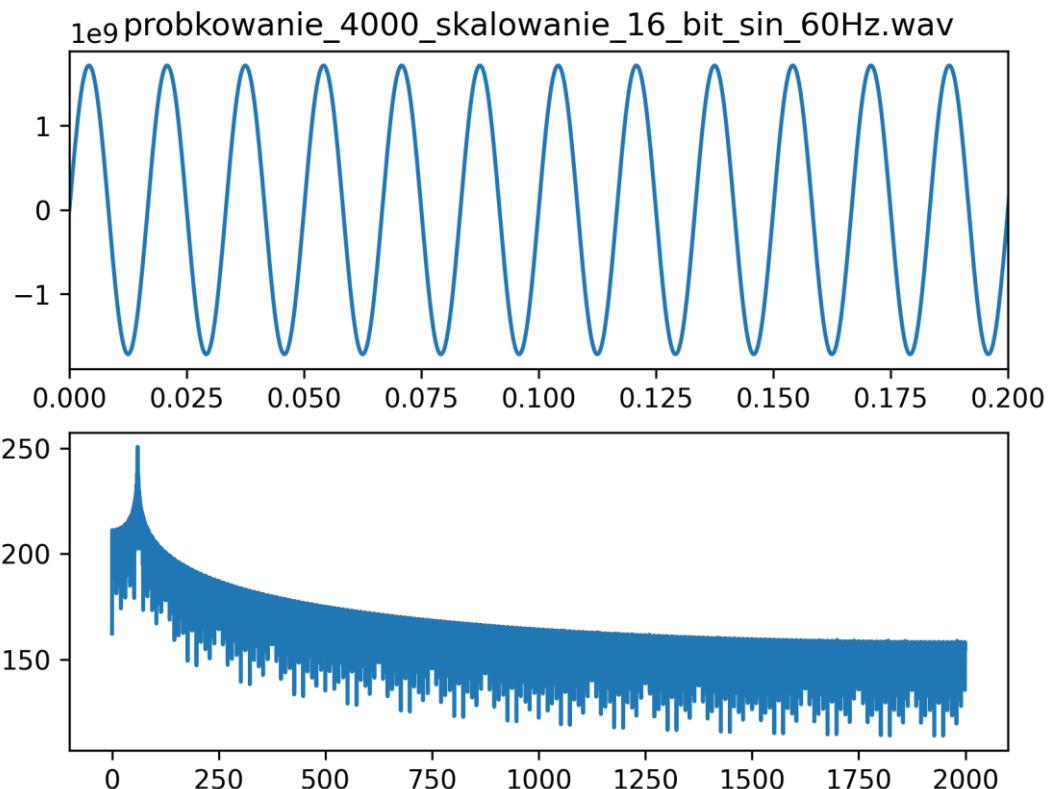
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Ratańczuk Sebastian rs44476

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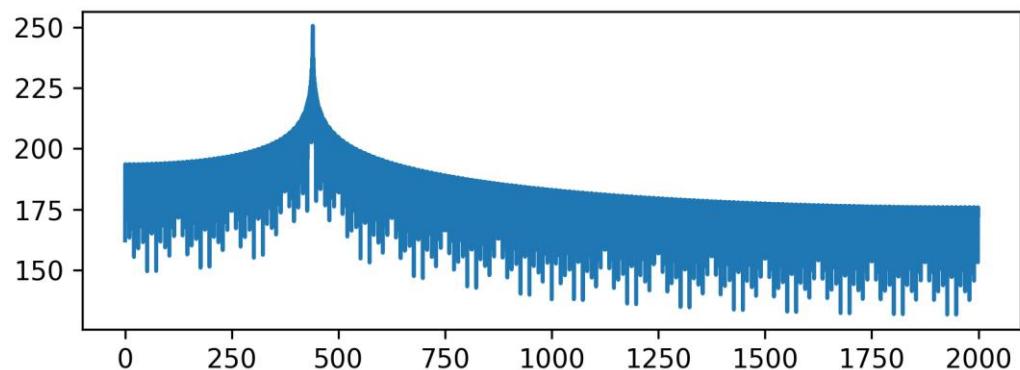
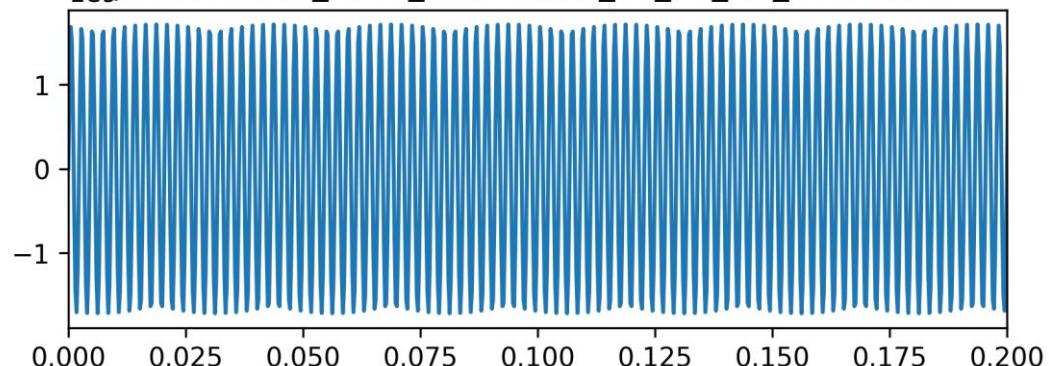




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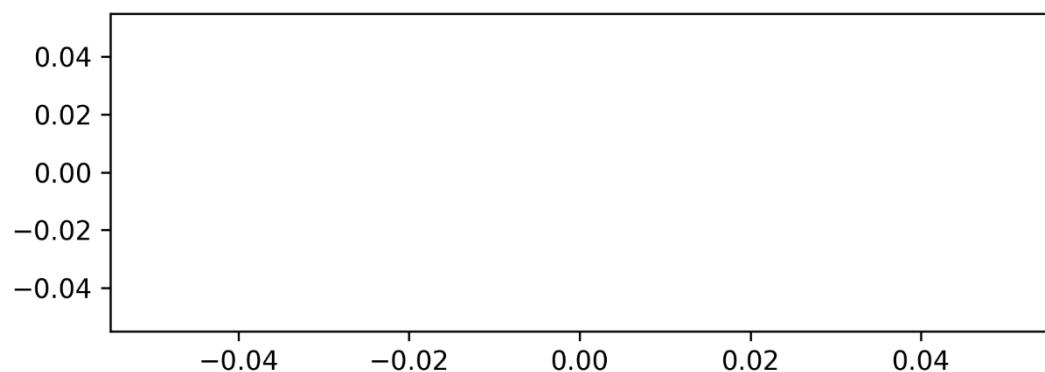
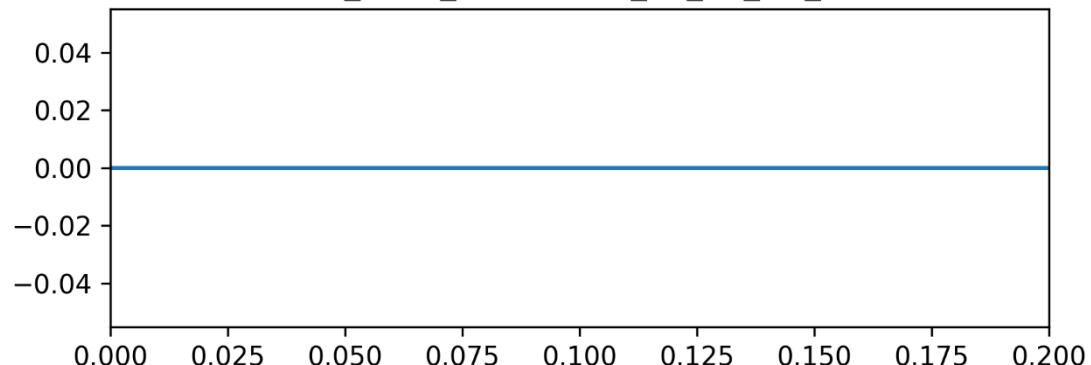
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gr321

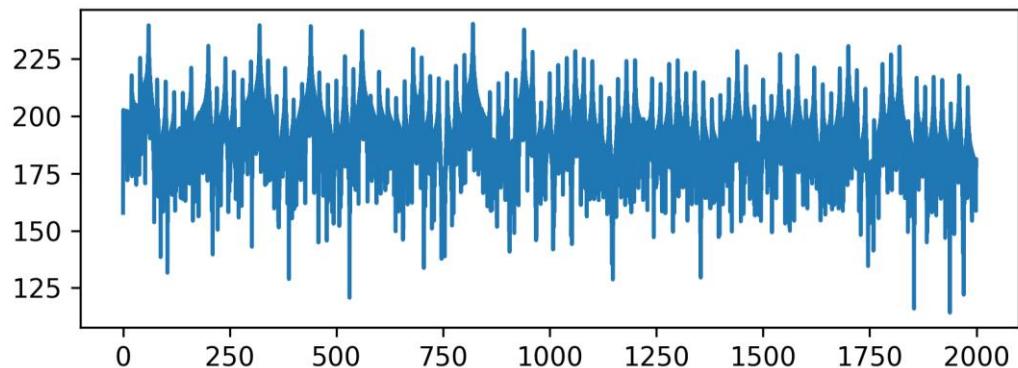
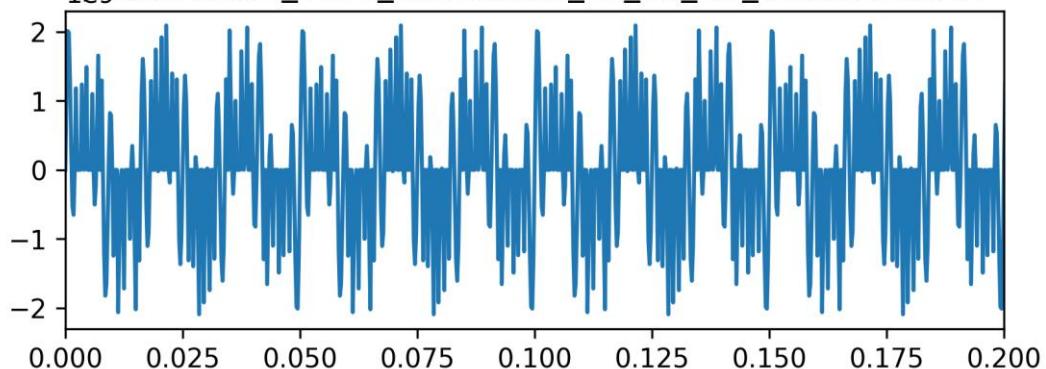
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gr321

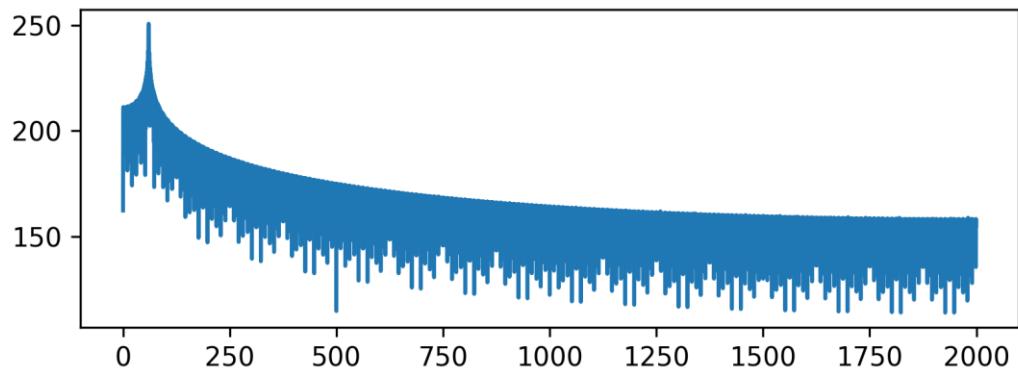
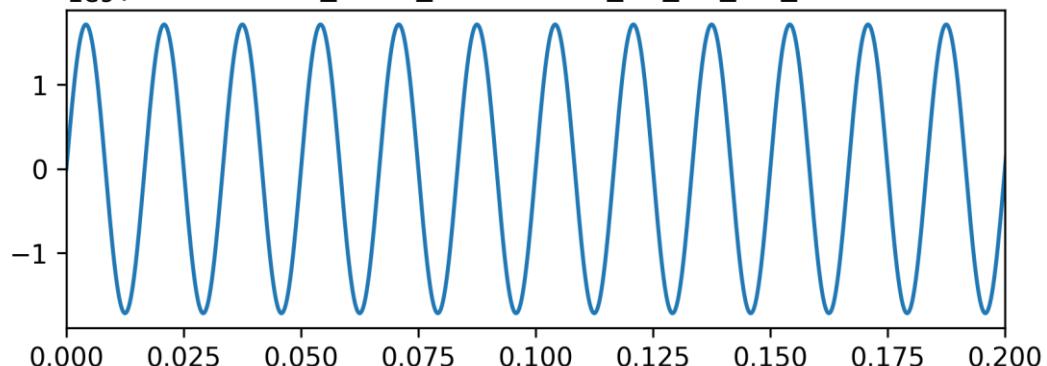
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Ratańczuk Sebastian rs44476

gr321

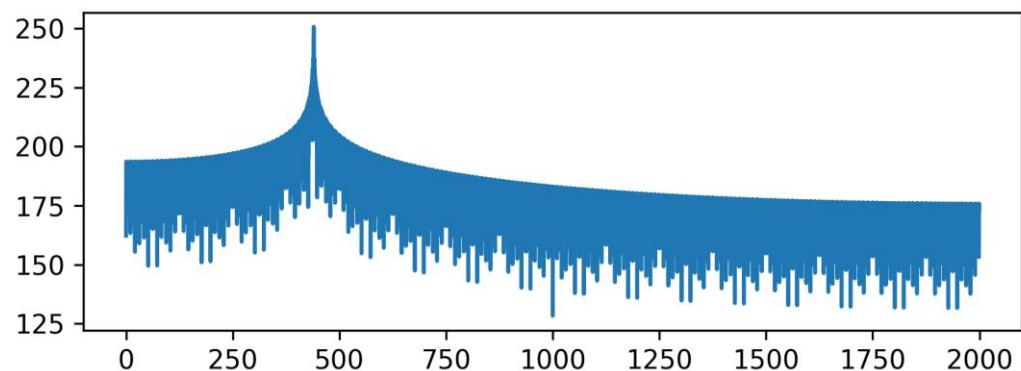
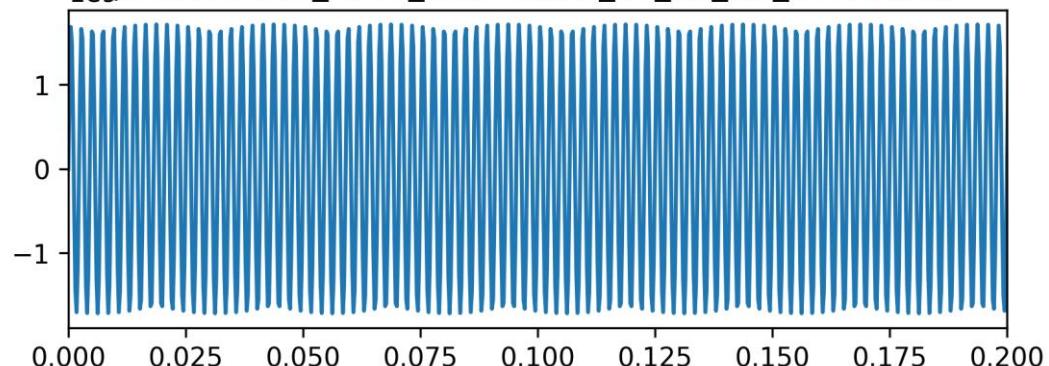
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Ratańczuk Sebastian rs44476

gr321

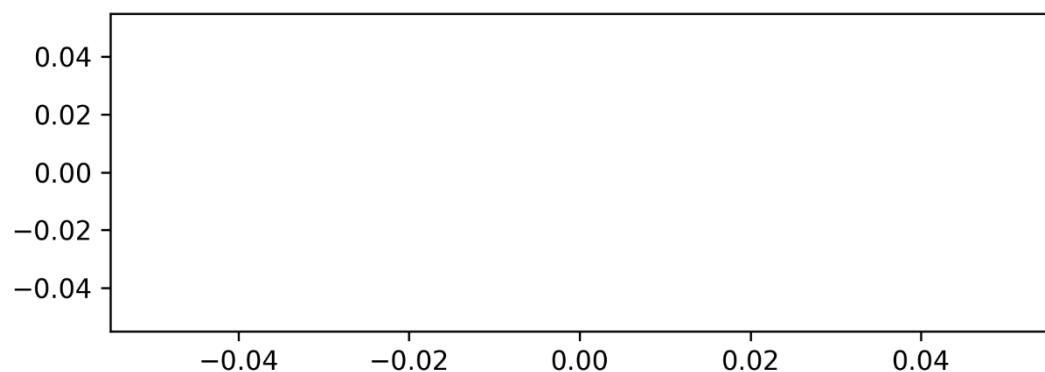
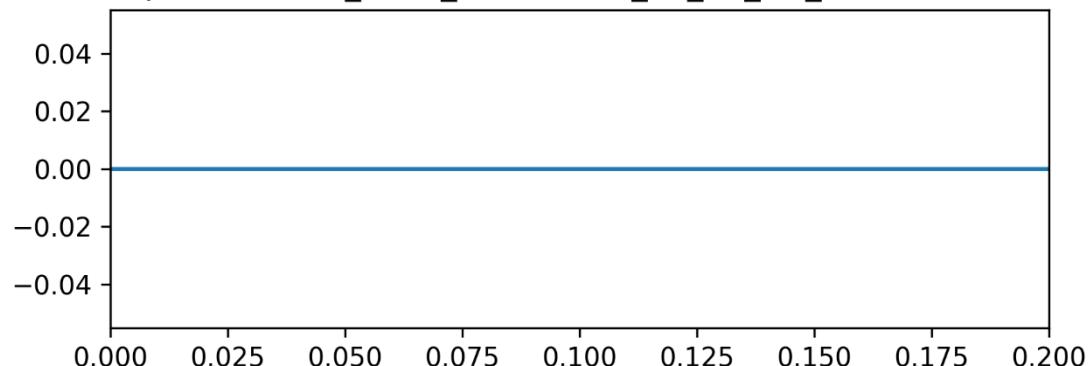
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Ratańczuk Sebastian rs44476

gr321

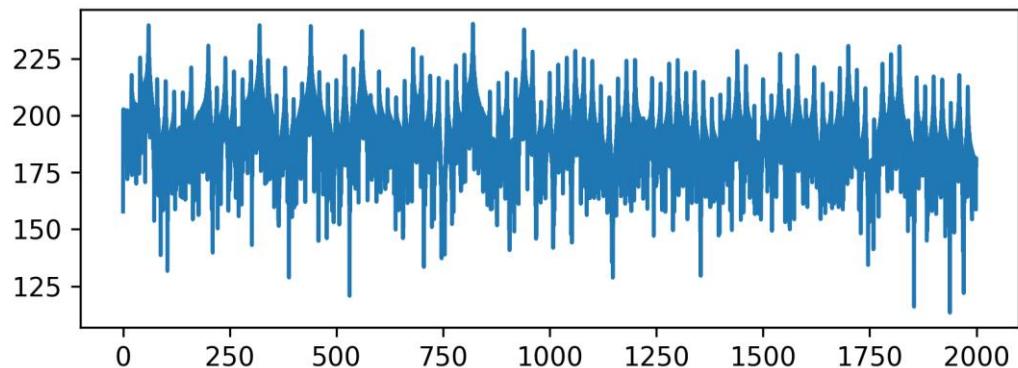
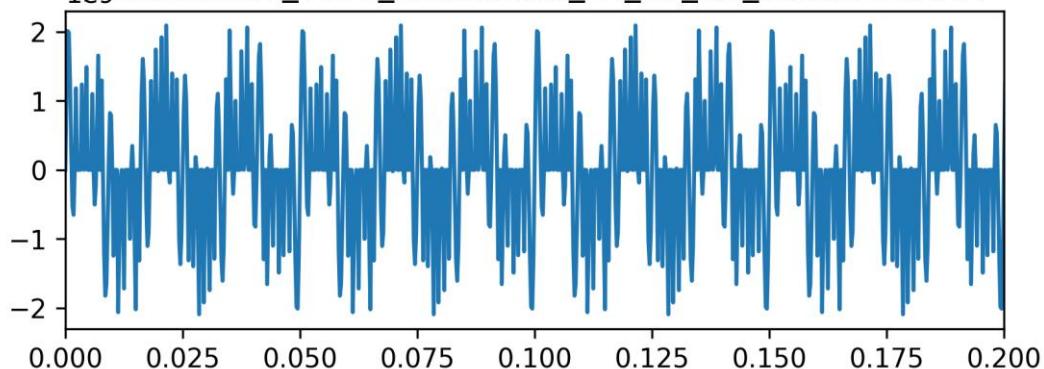
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Ratańczuk Sebastian rs44476

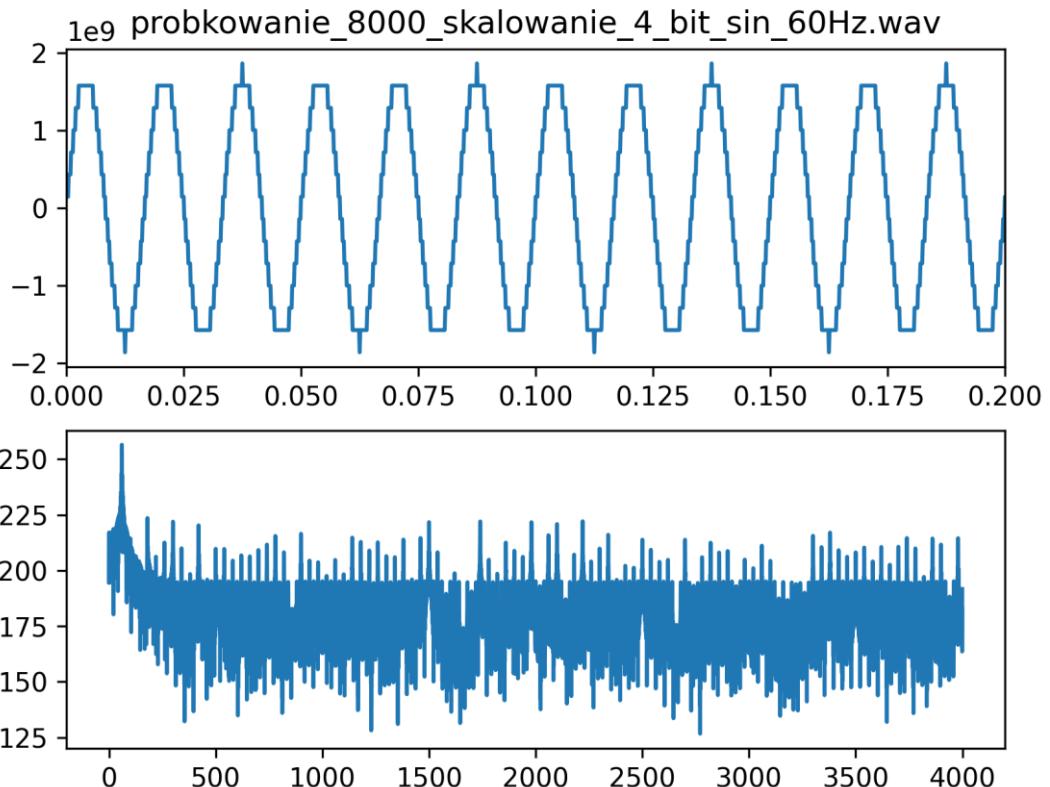
gr321

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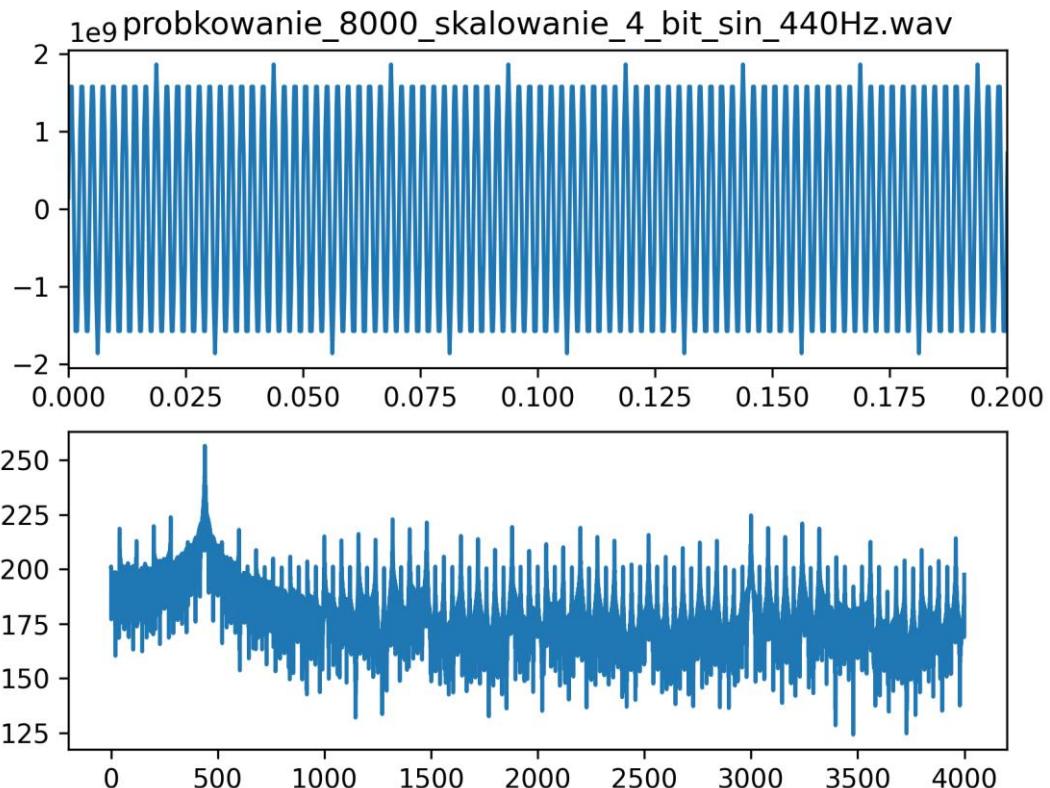
Ratańczuk Sebastian rs44476

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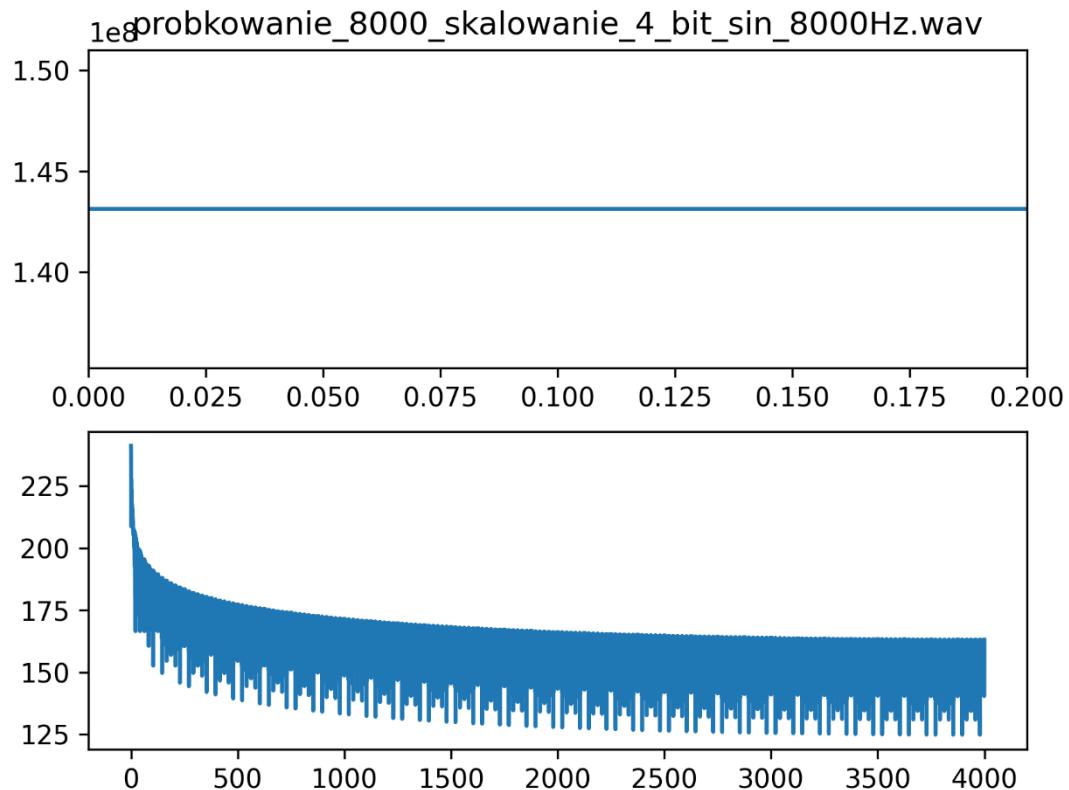
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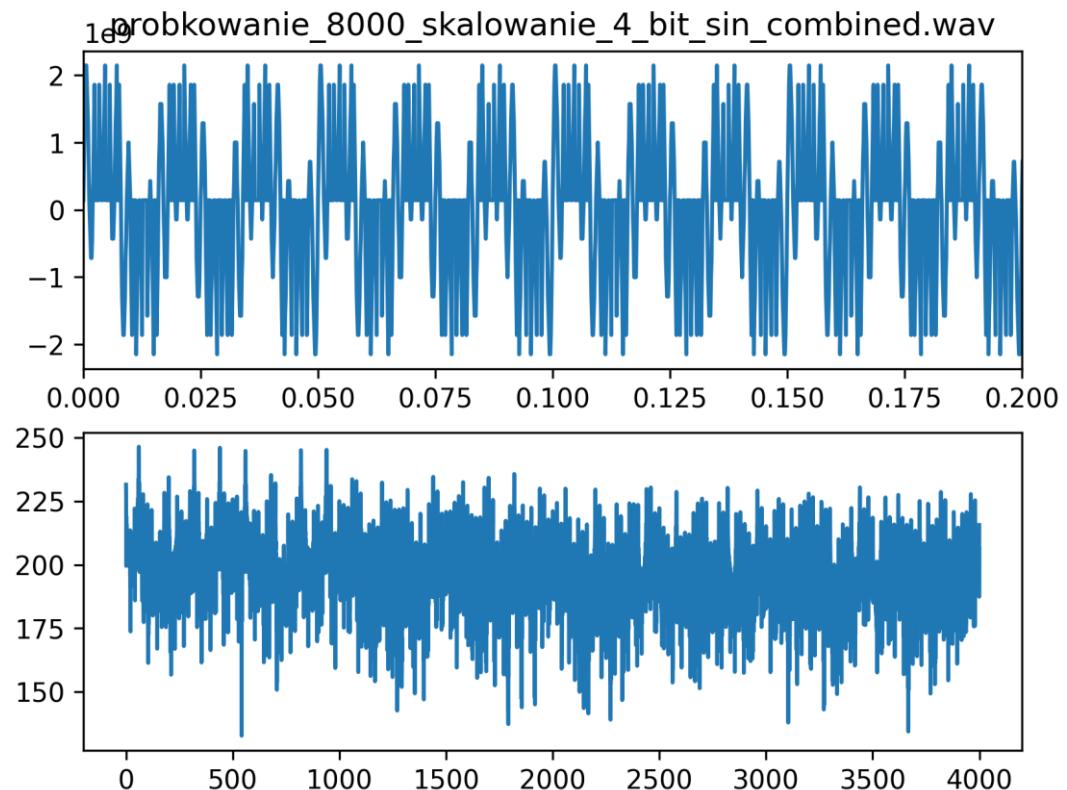
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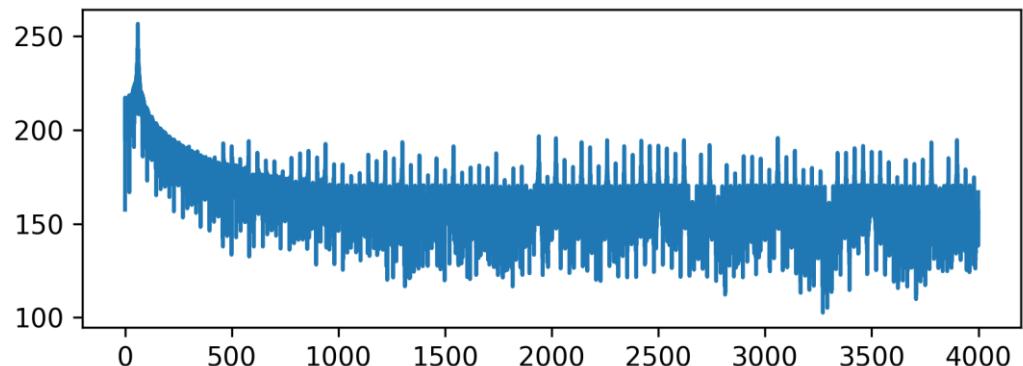
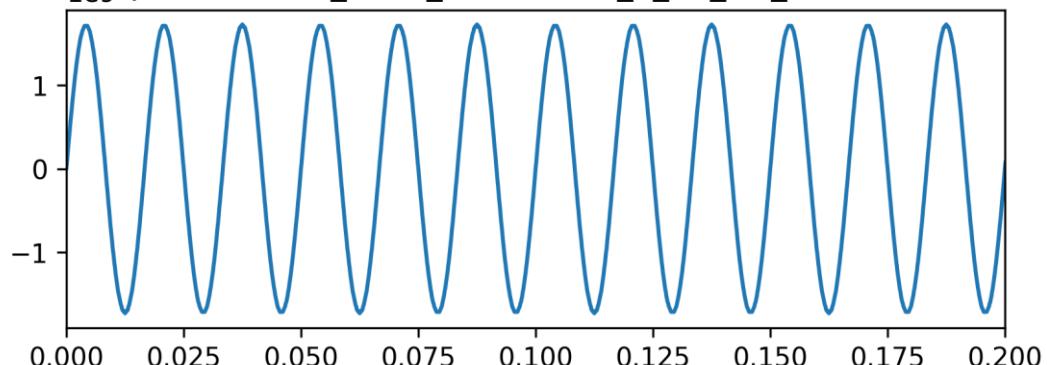
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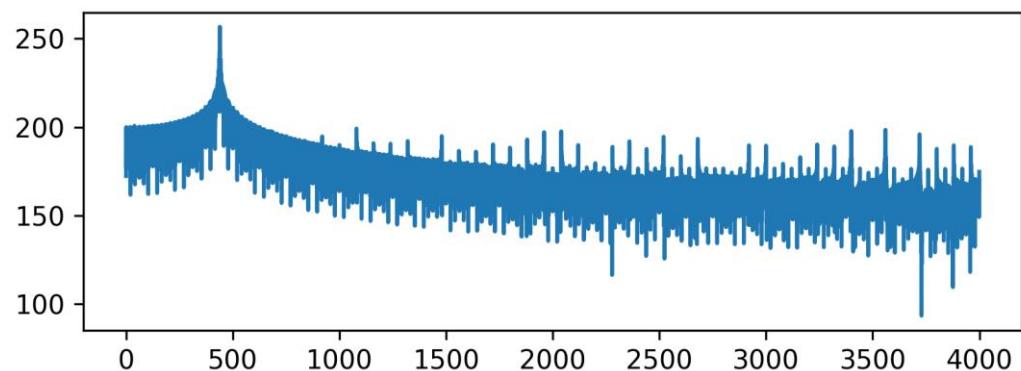
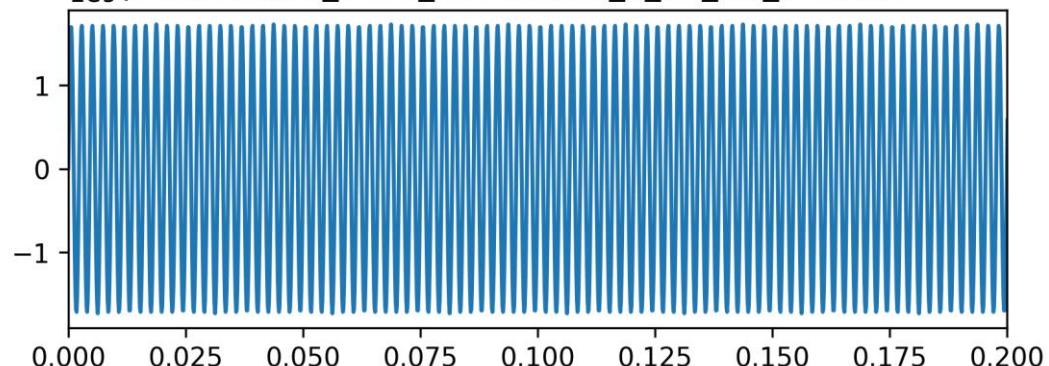
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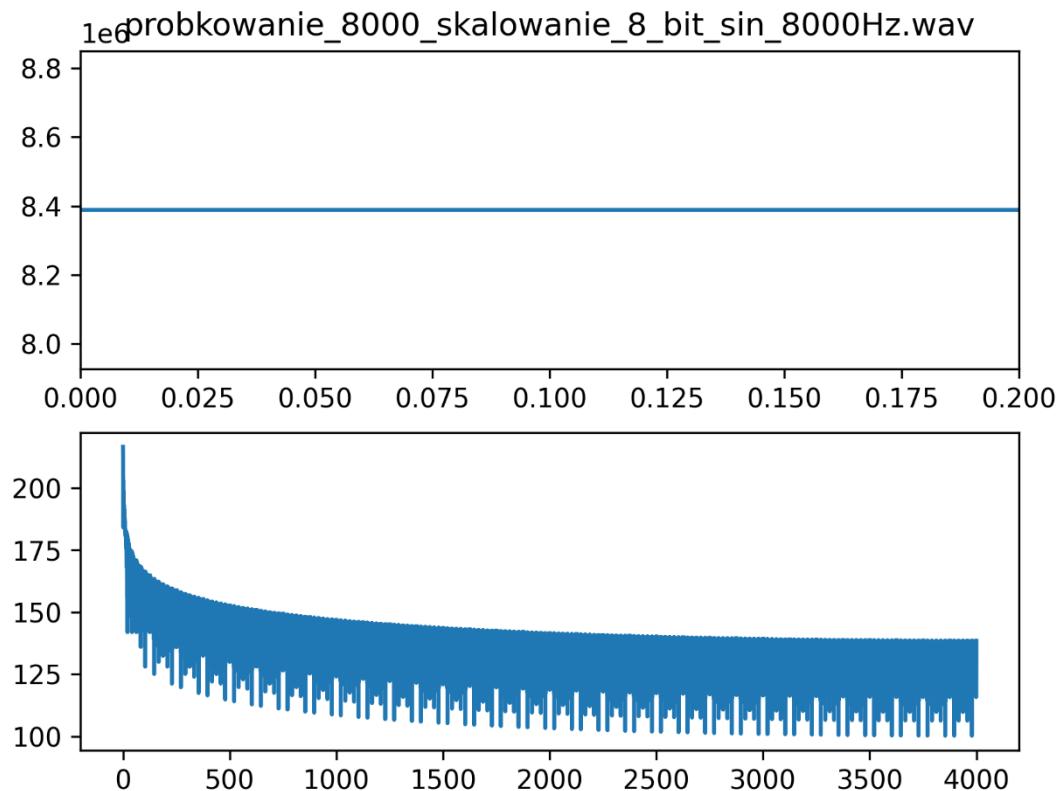
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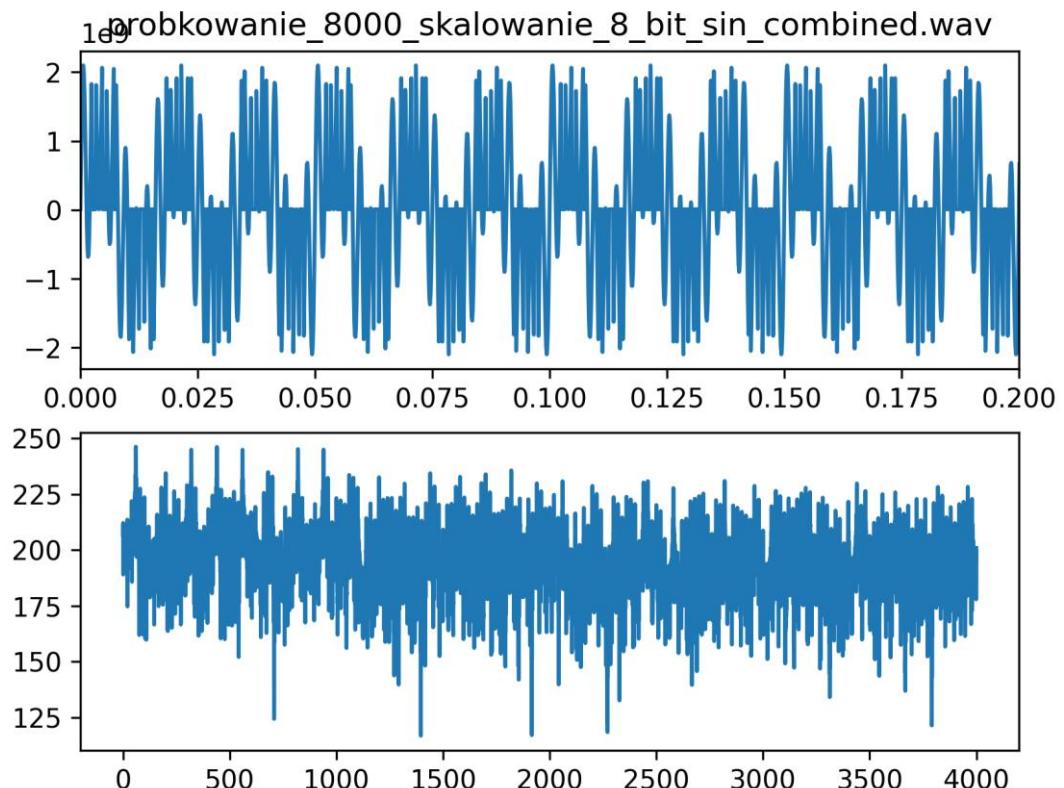
Ratańczuk Sebastian rs44476

gr321



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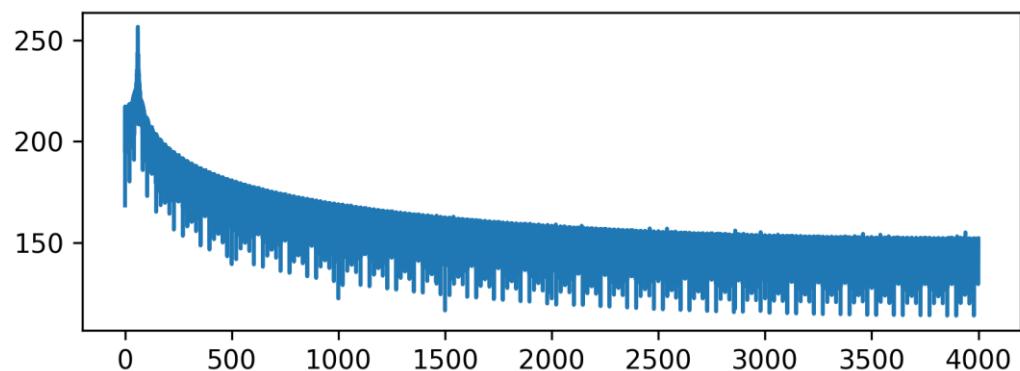
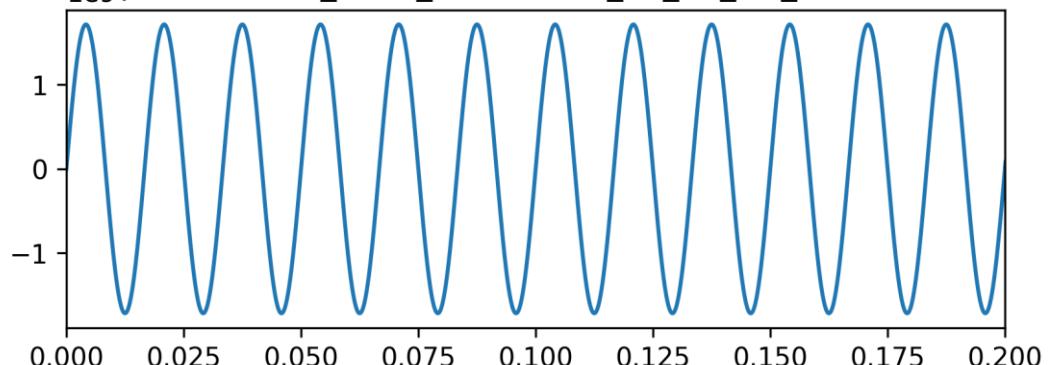
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Ratańczuk Sebastian rs44476

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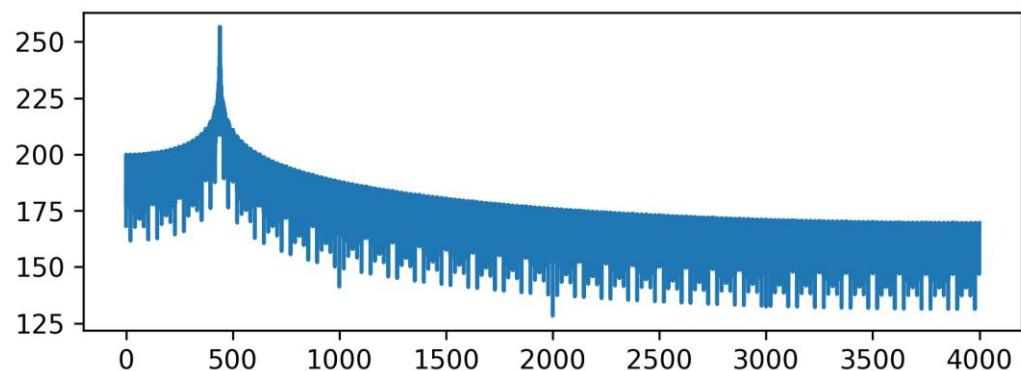
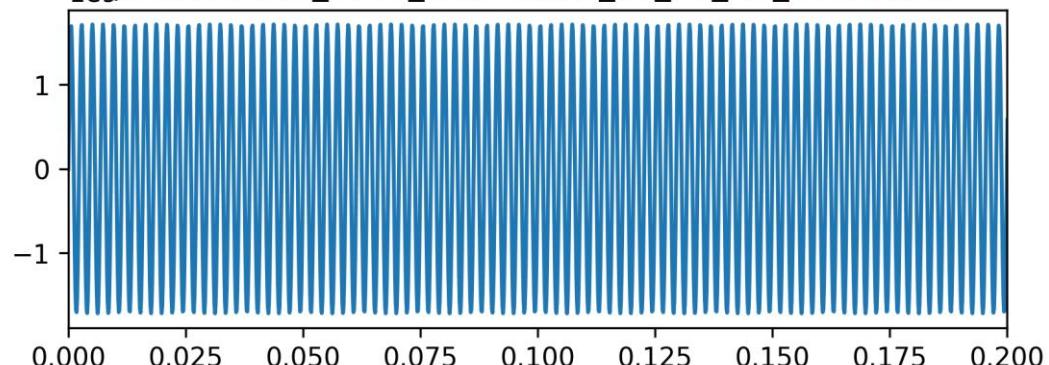
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Ratańczuk Sebastian rs44476

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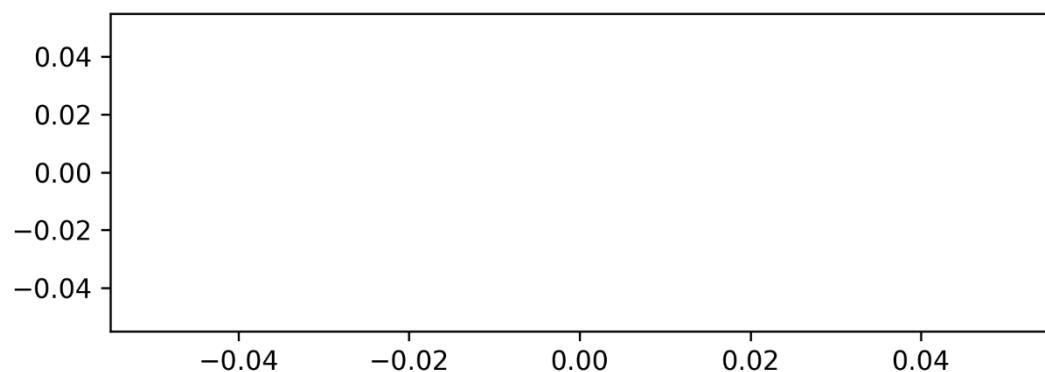
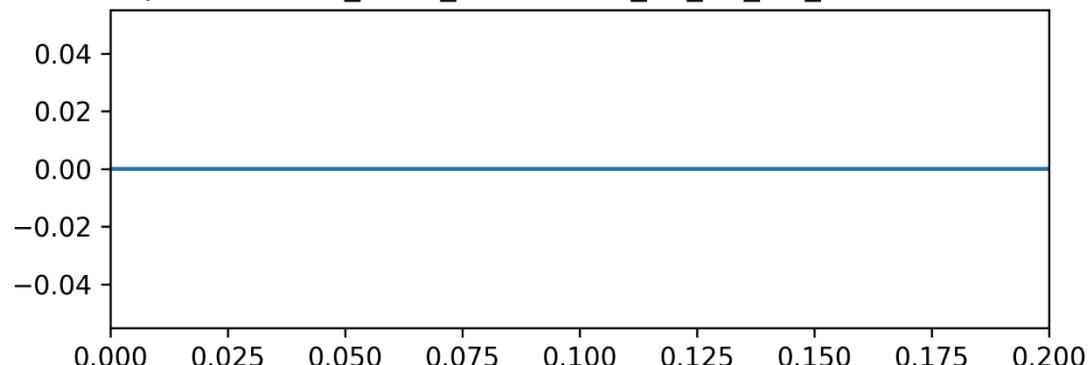
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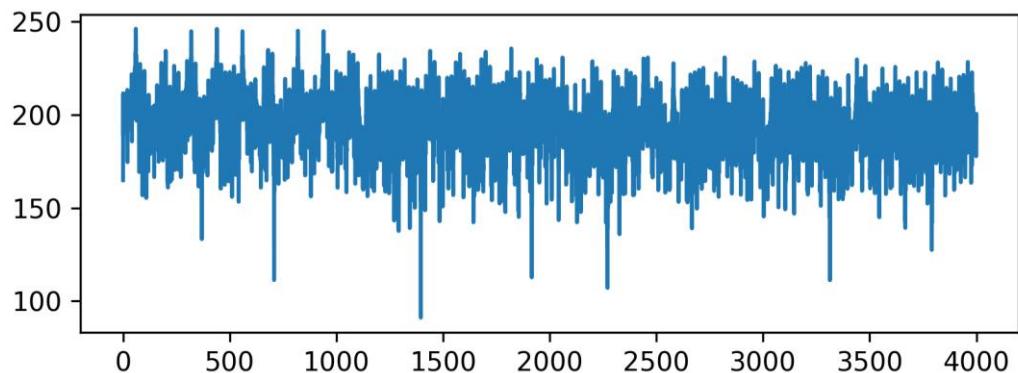
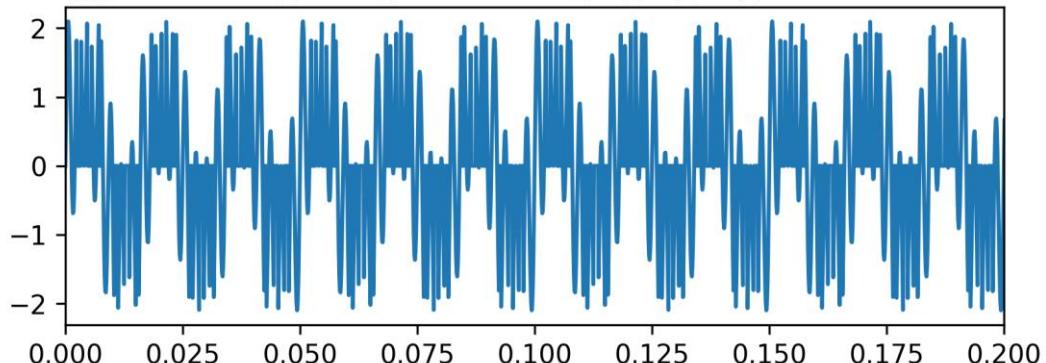
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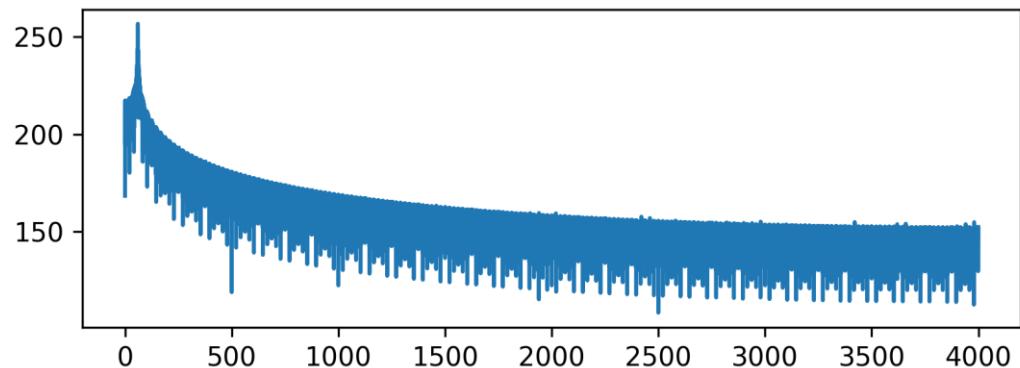
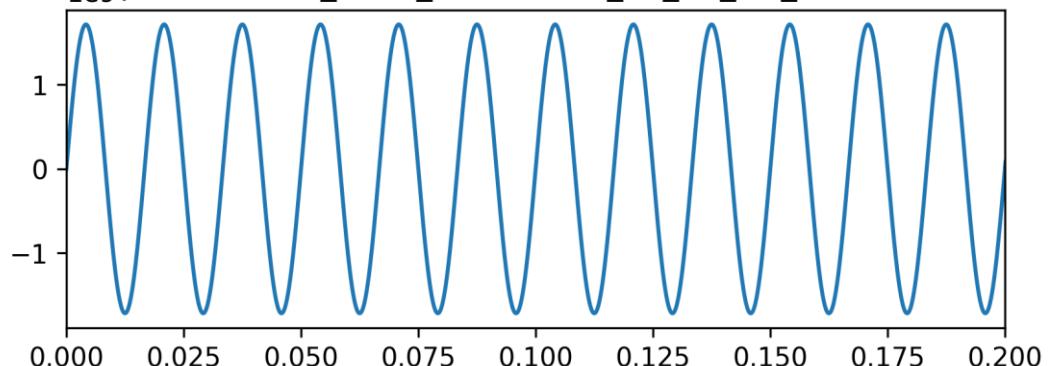
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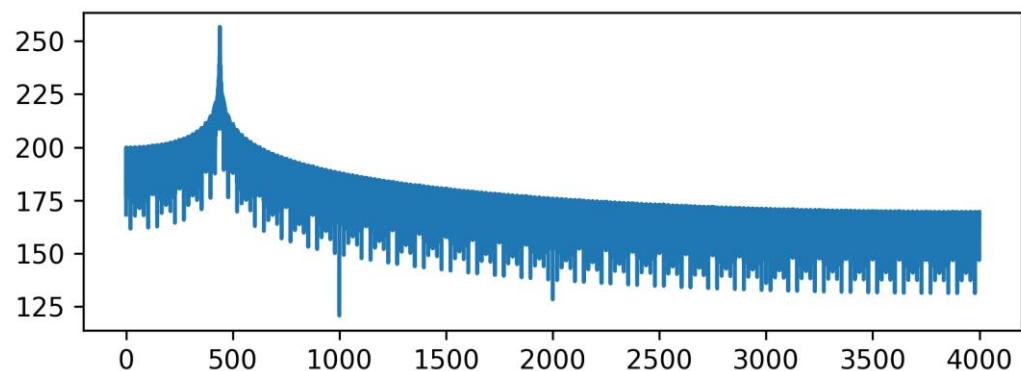
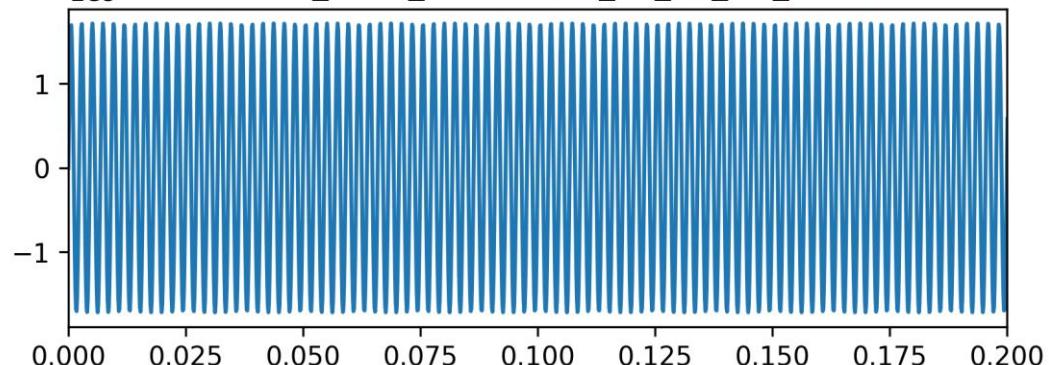
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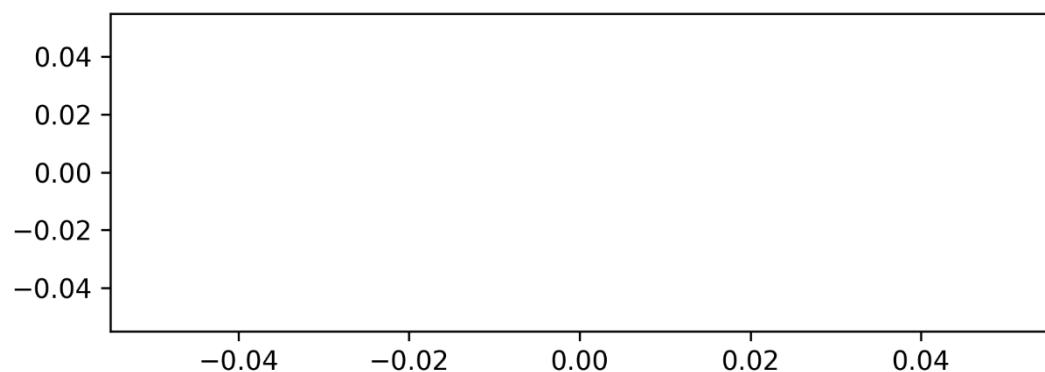
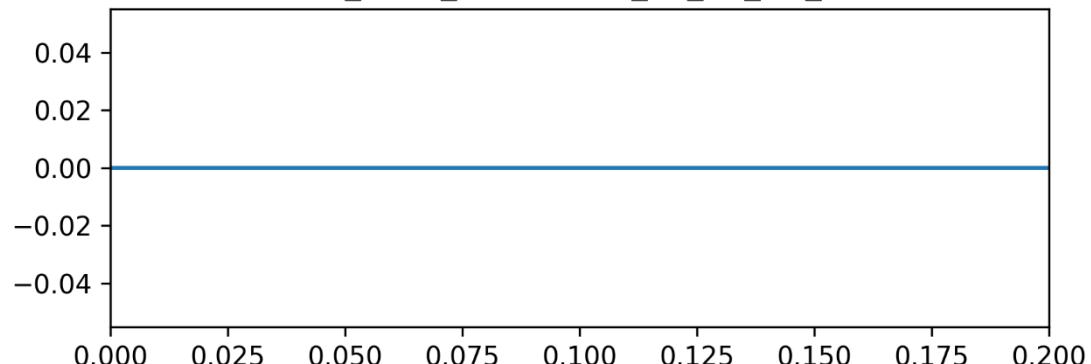
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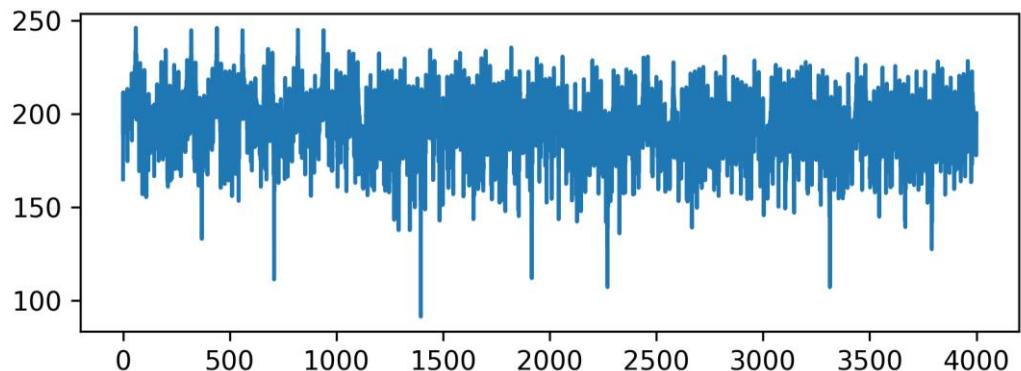
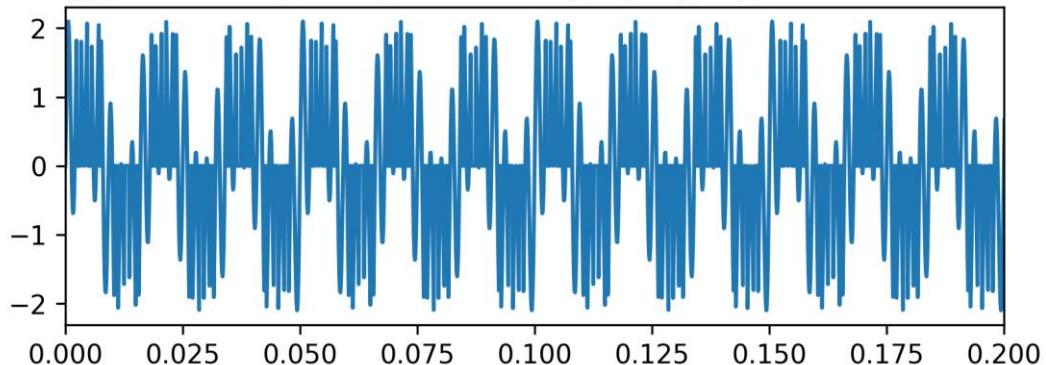
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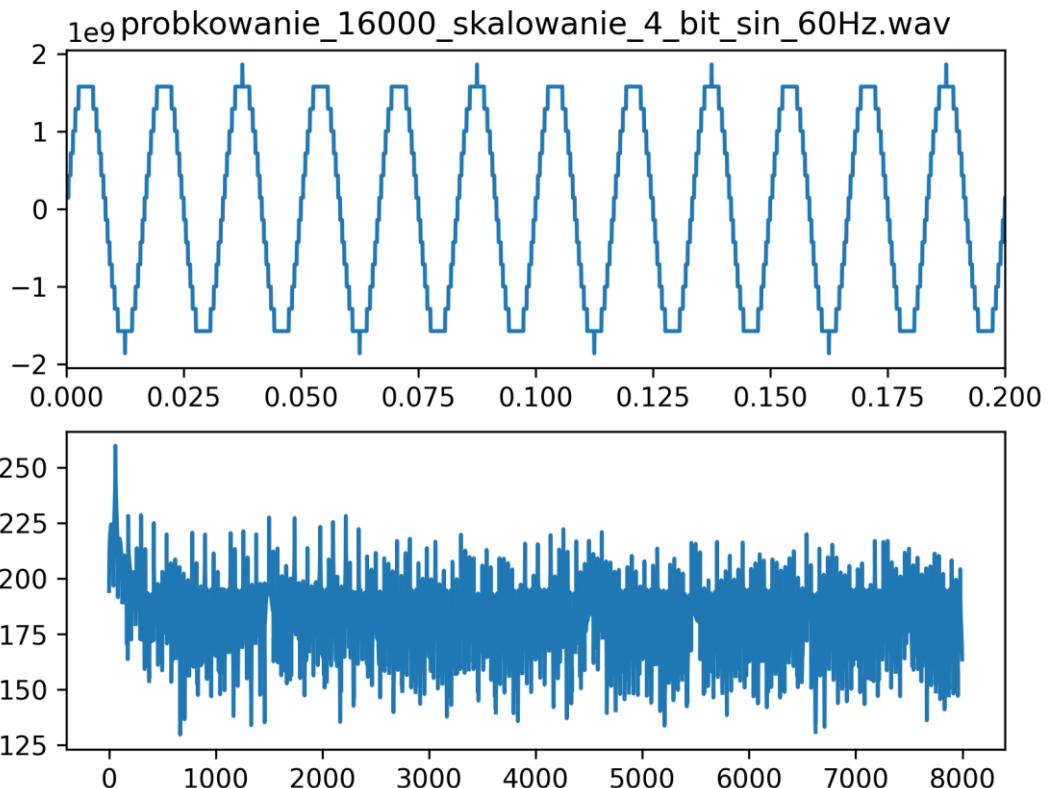
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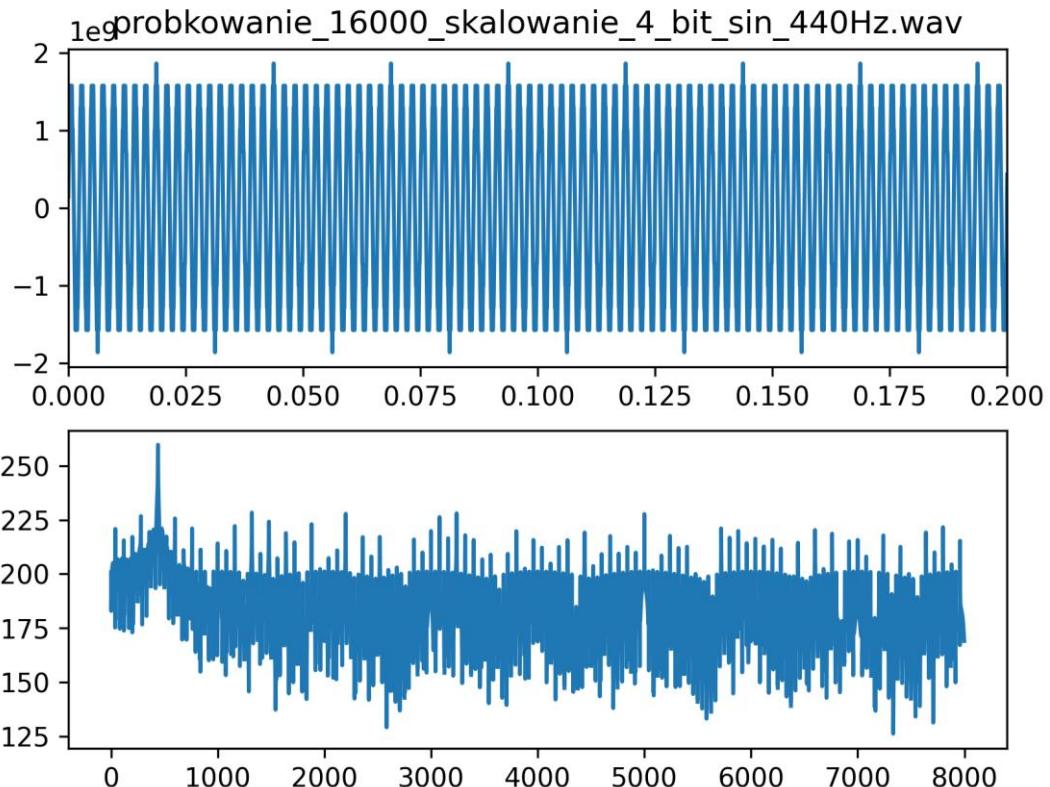
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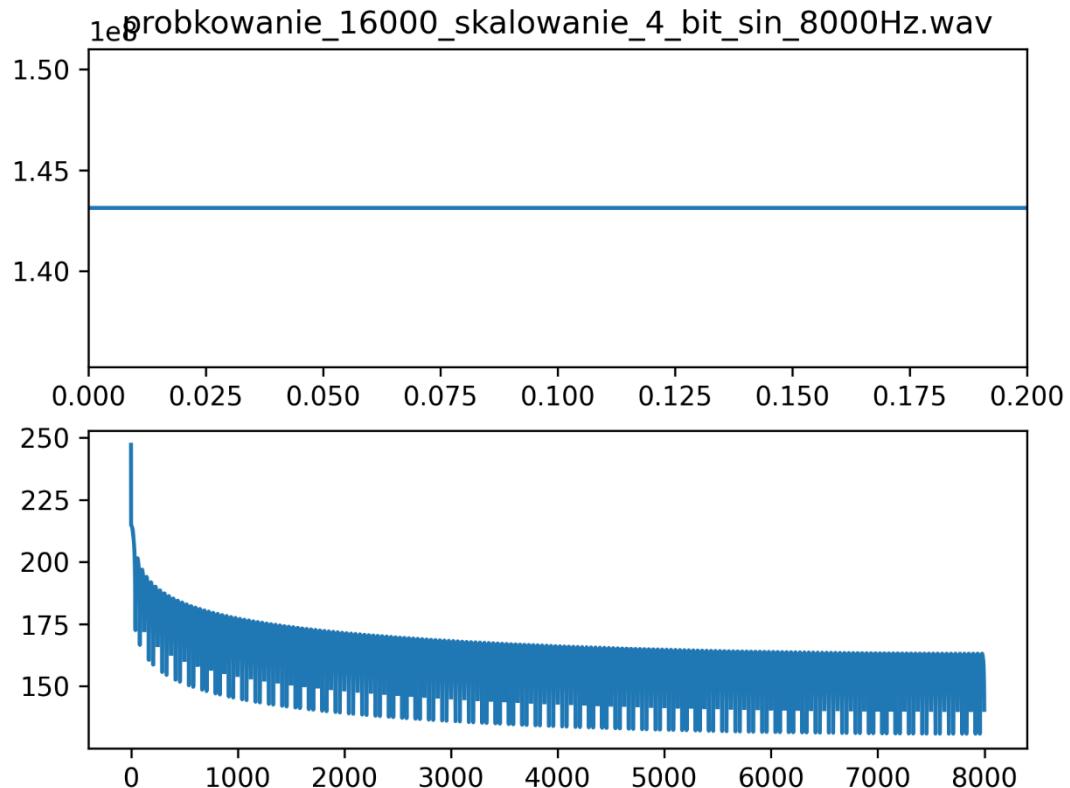
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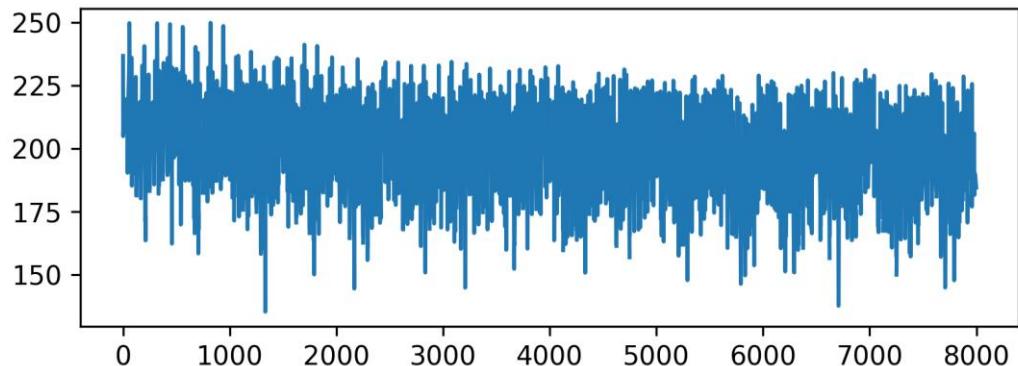
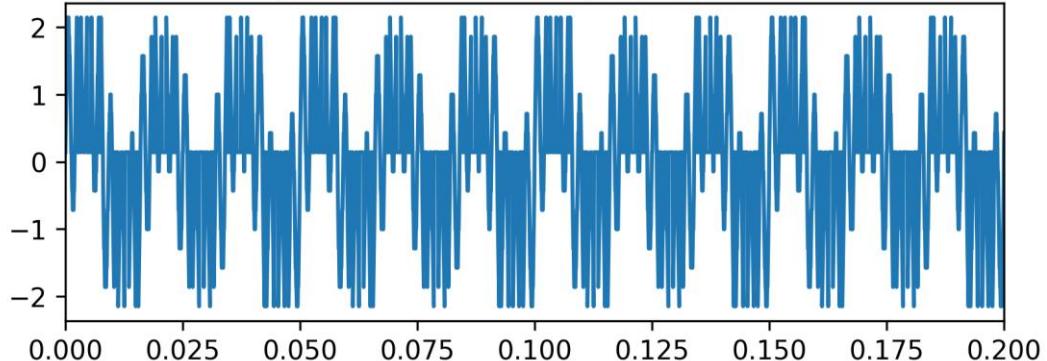
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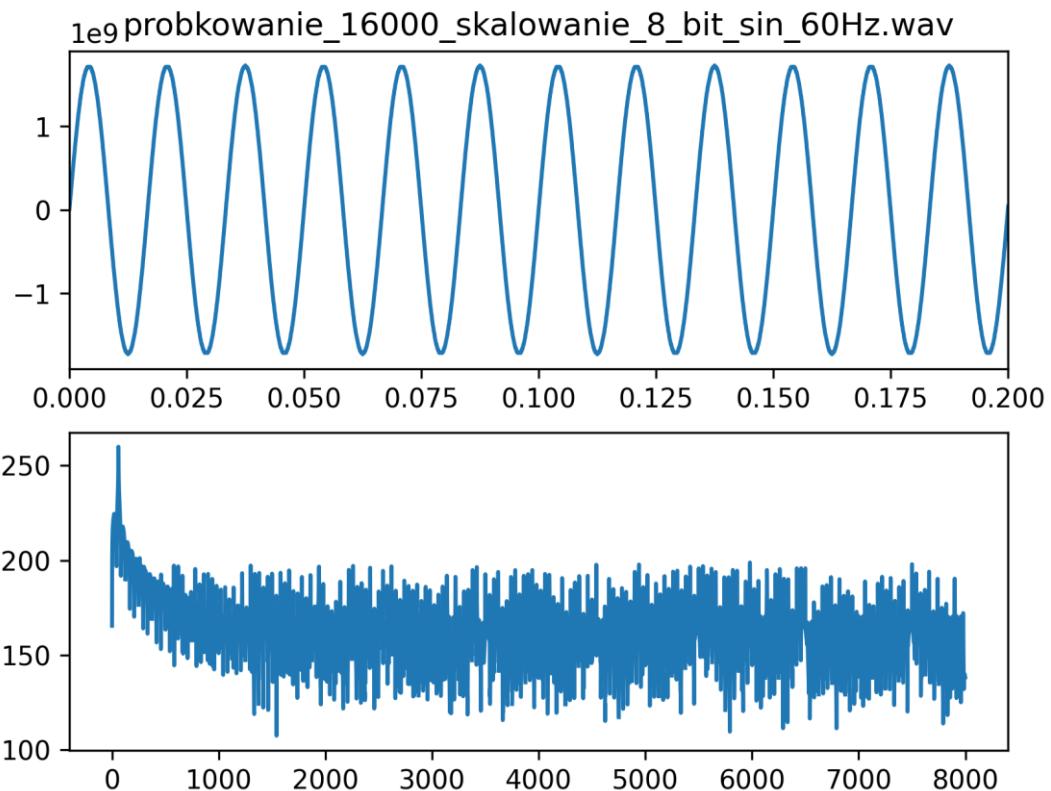
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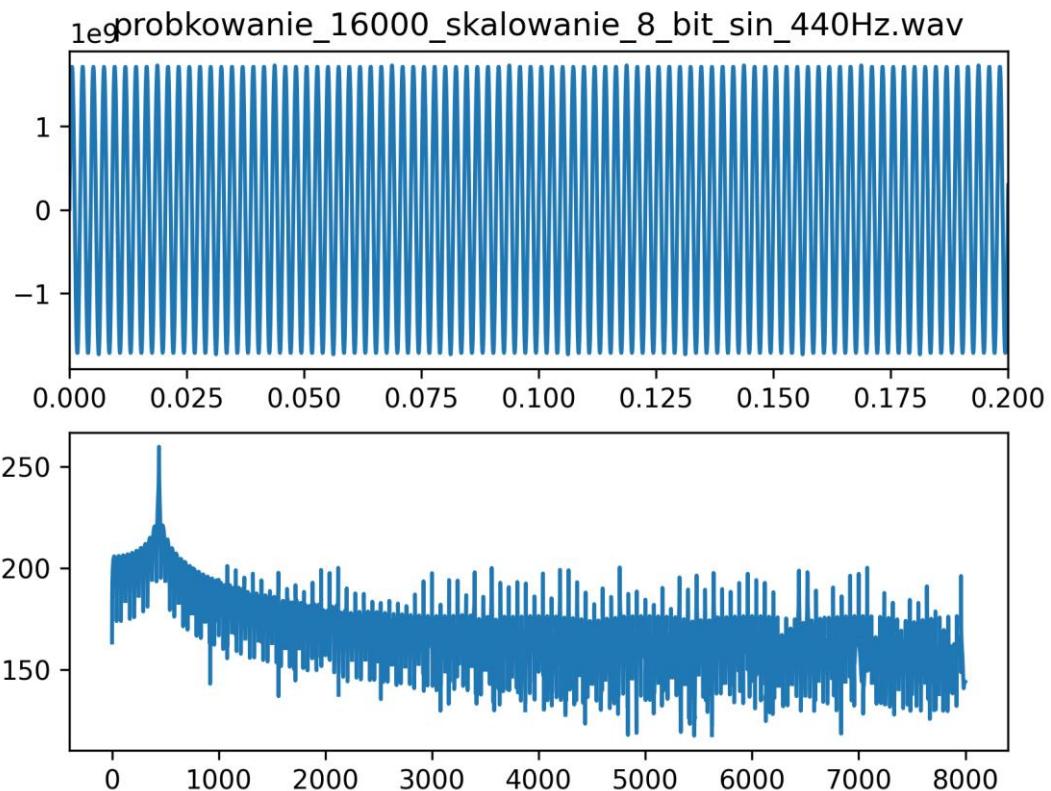
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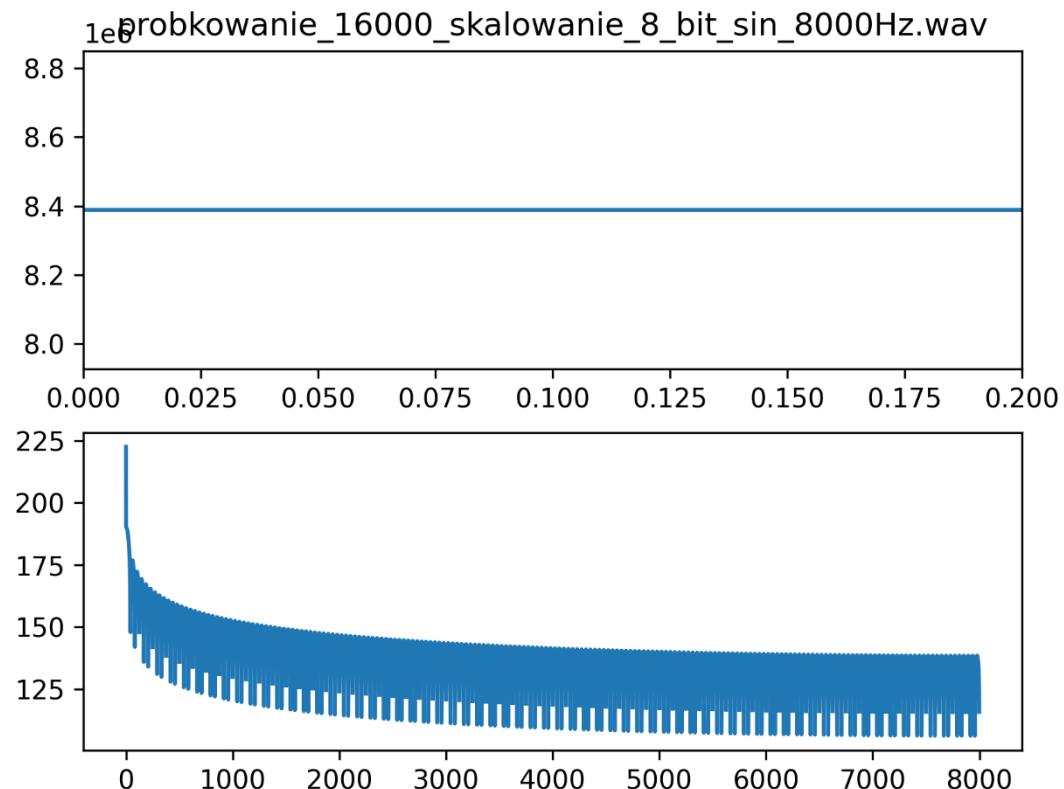
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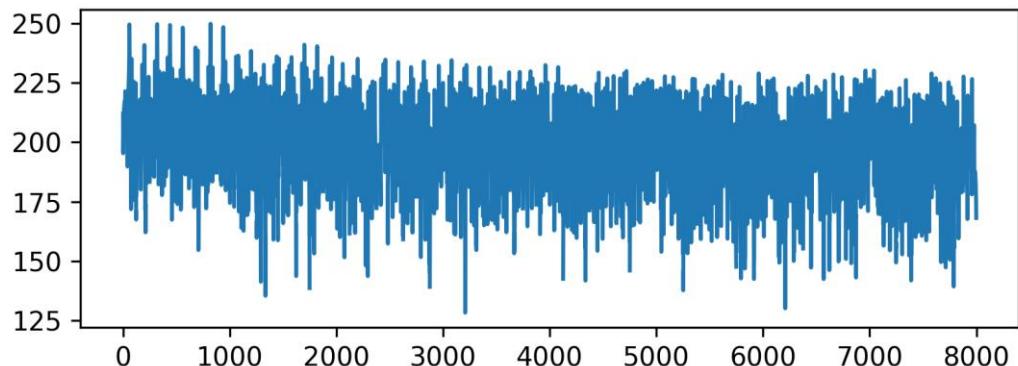
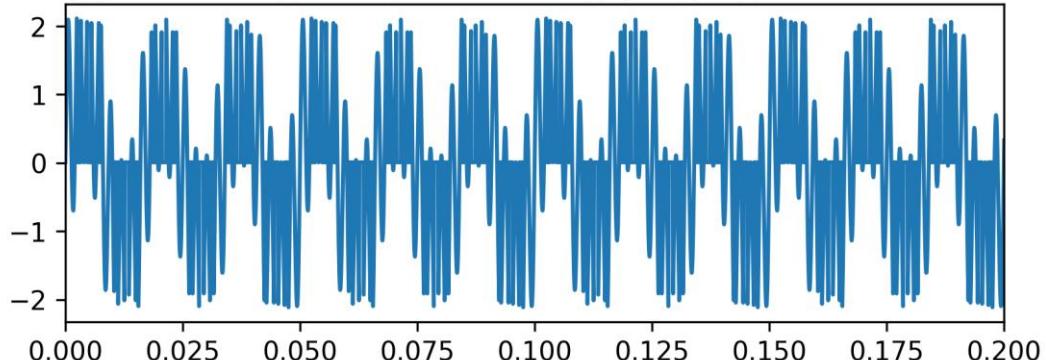
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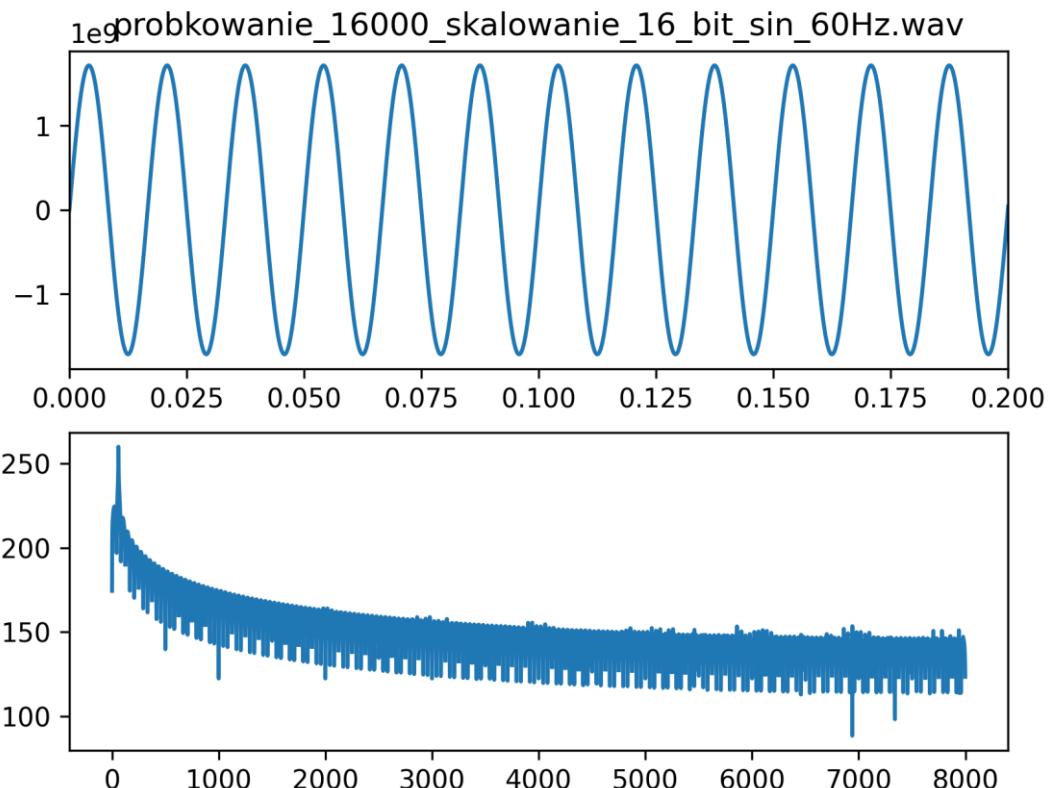
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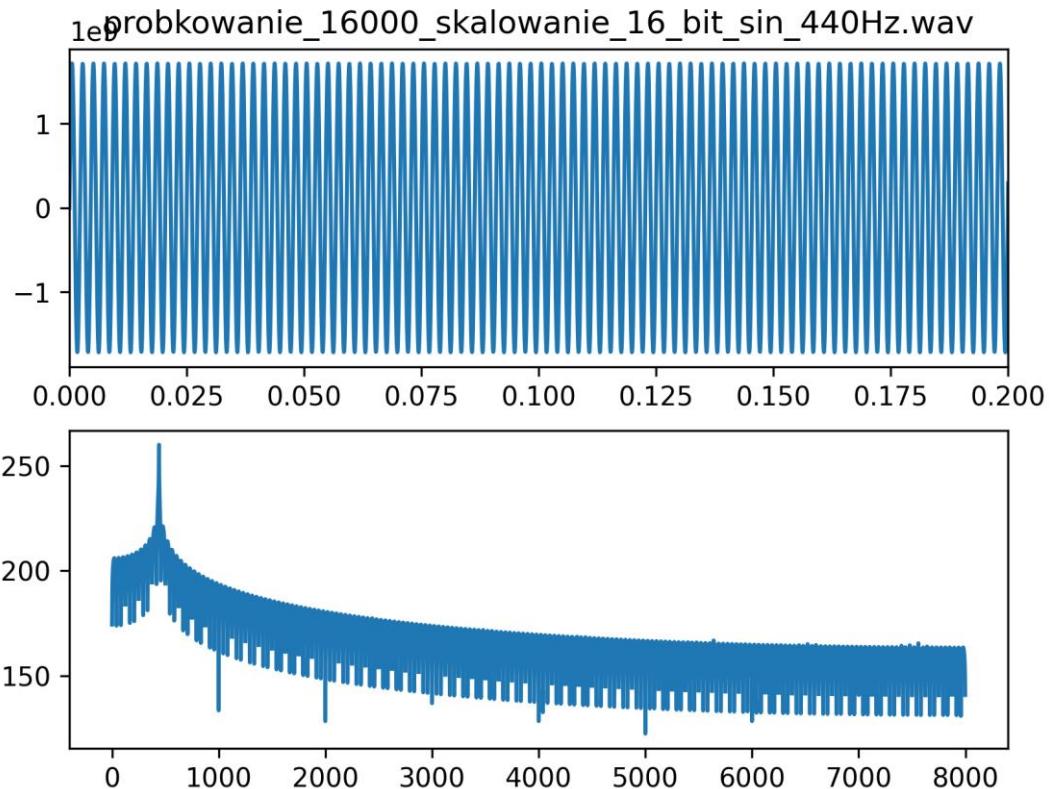
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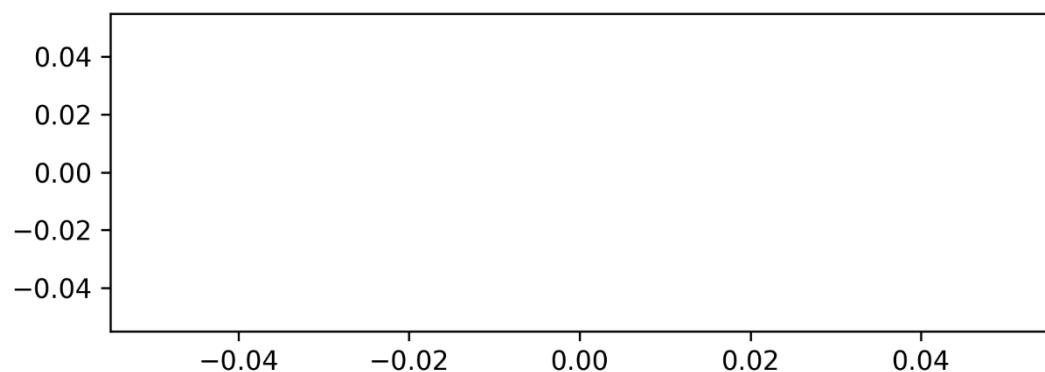
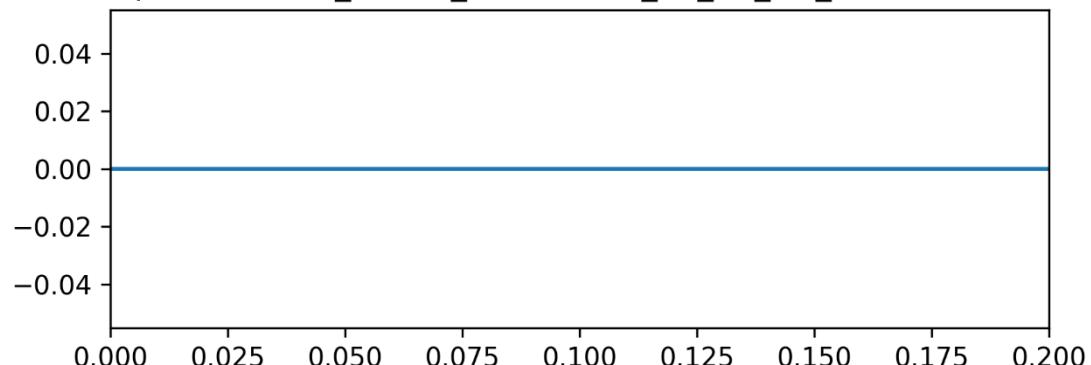
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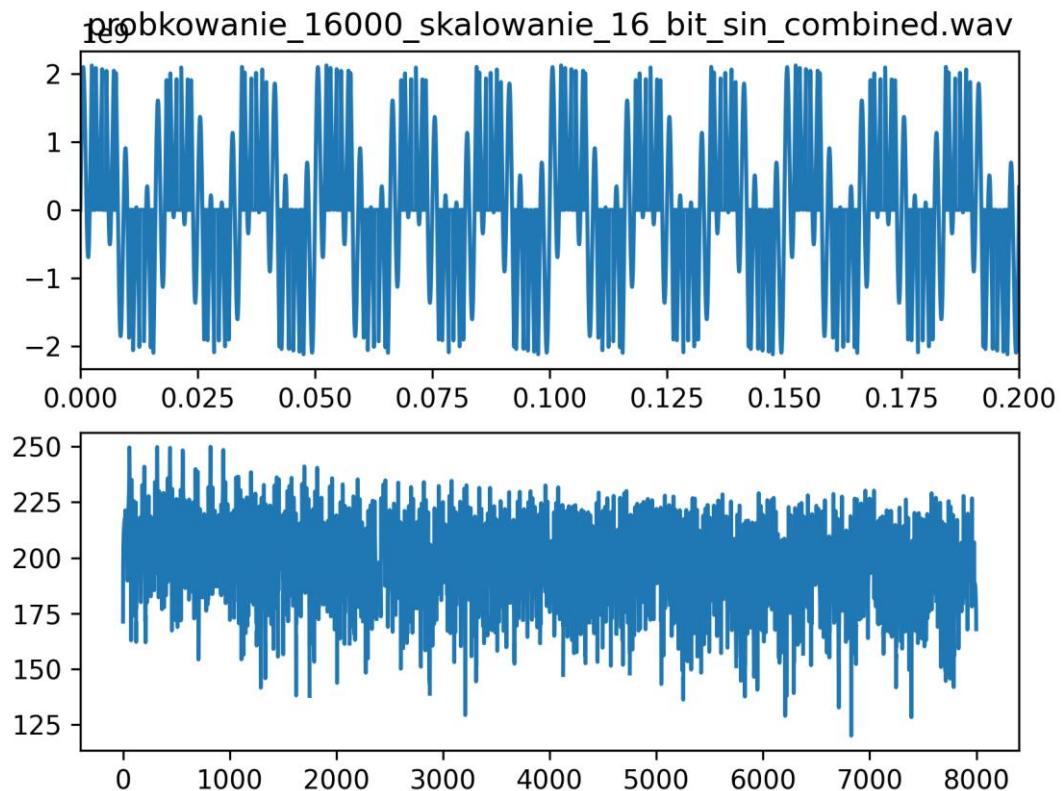
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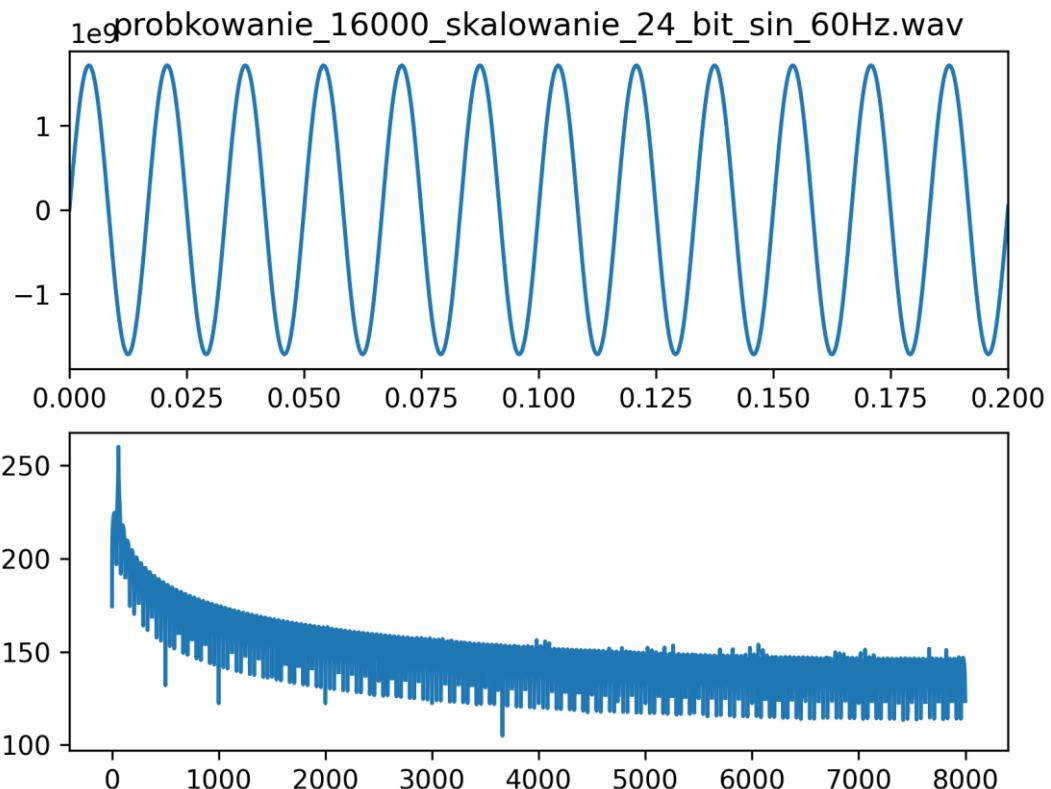
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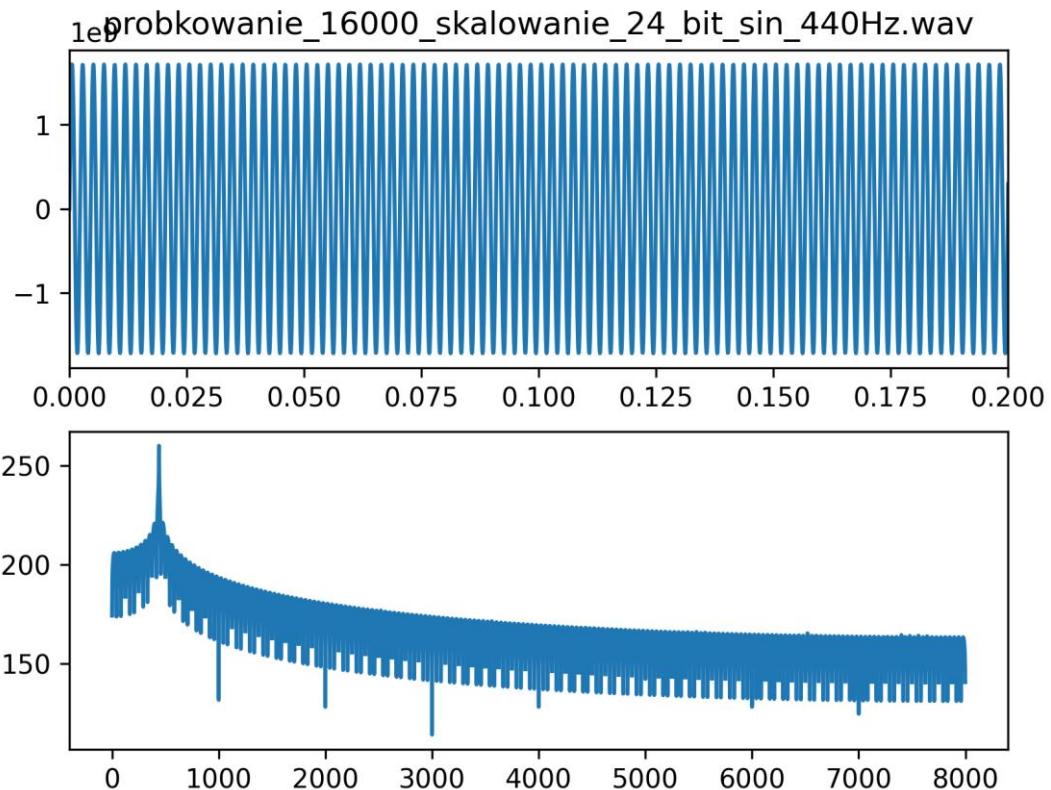
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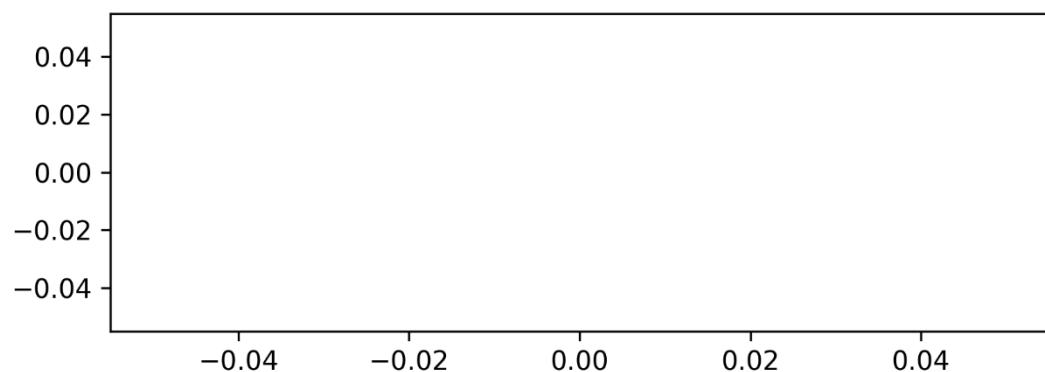
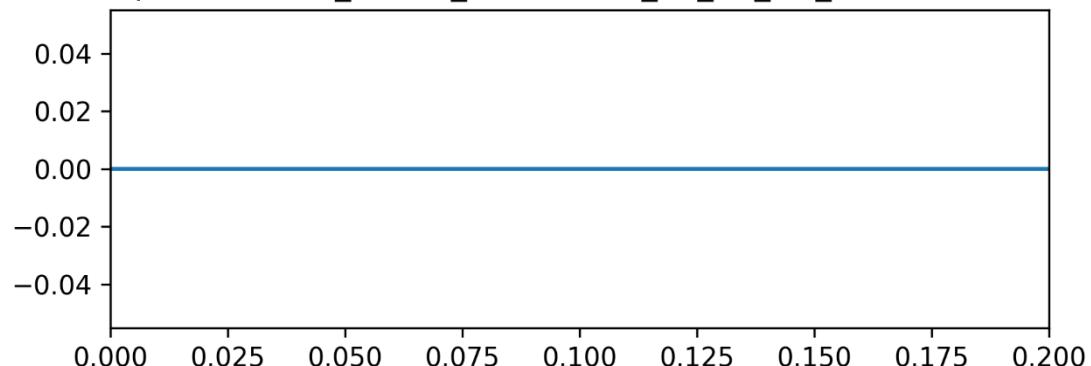
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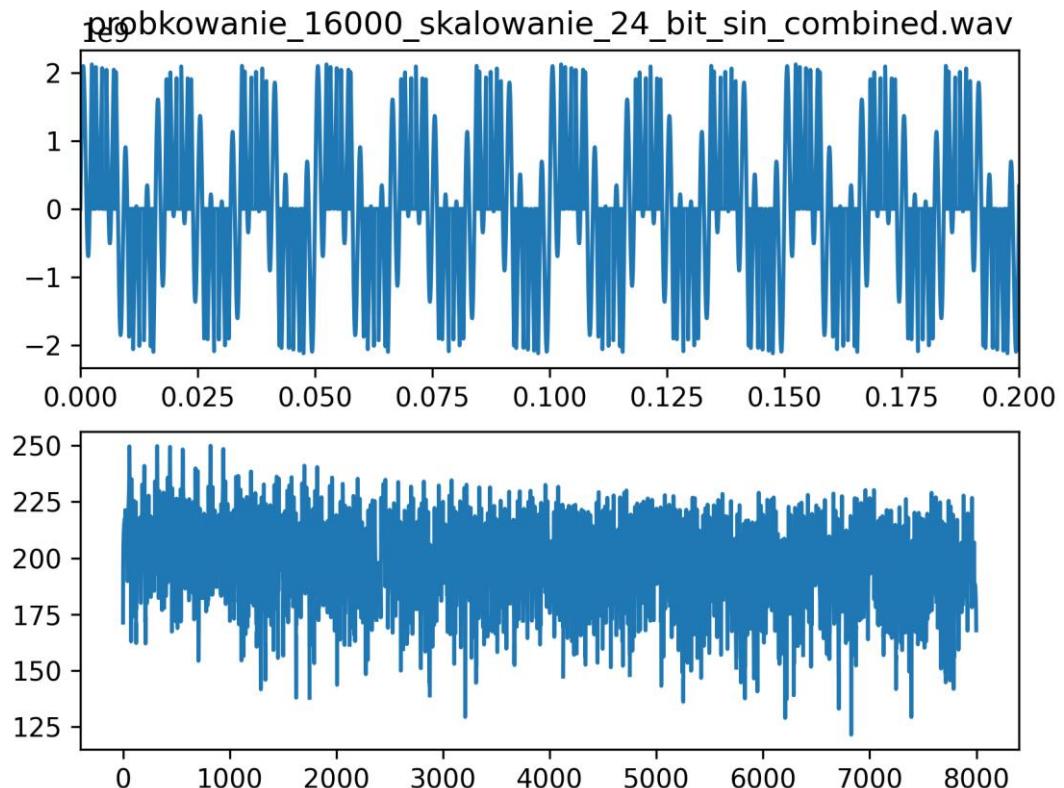
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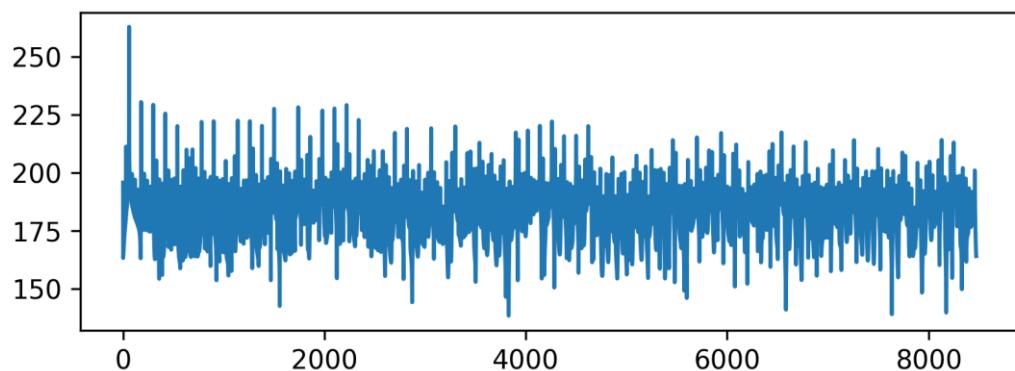
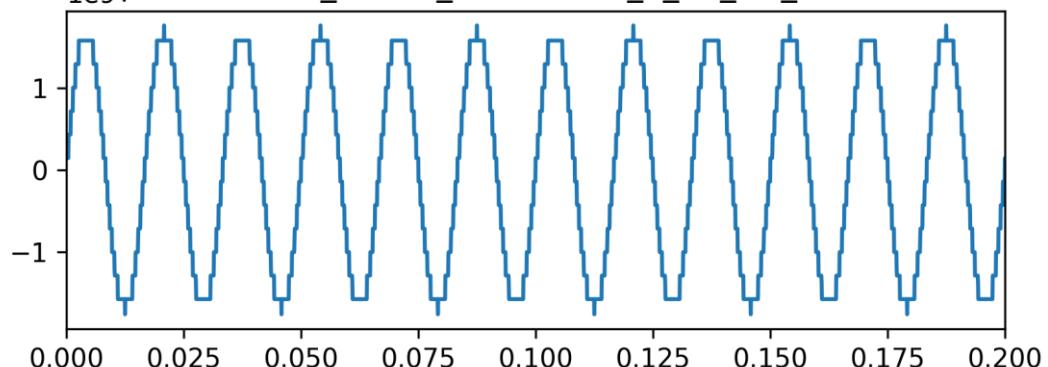
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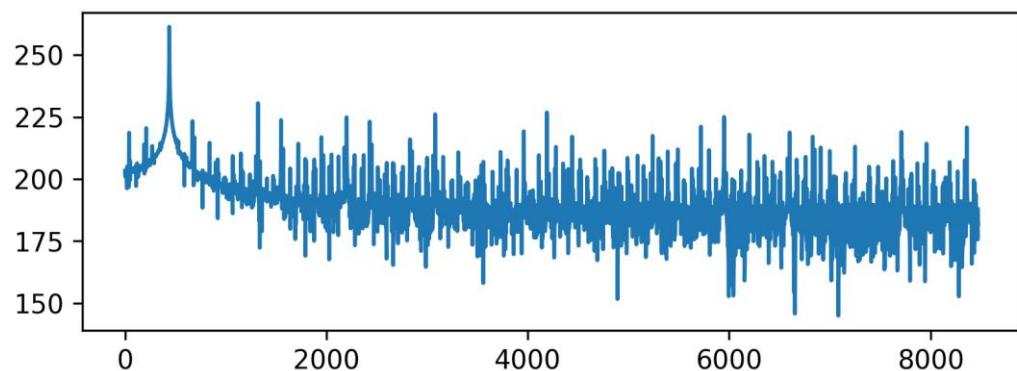
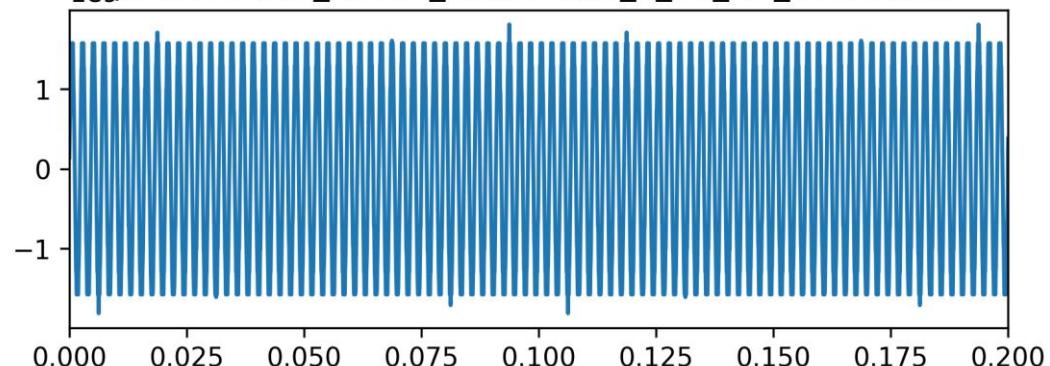
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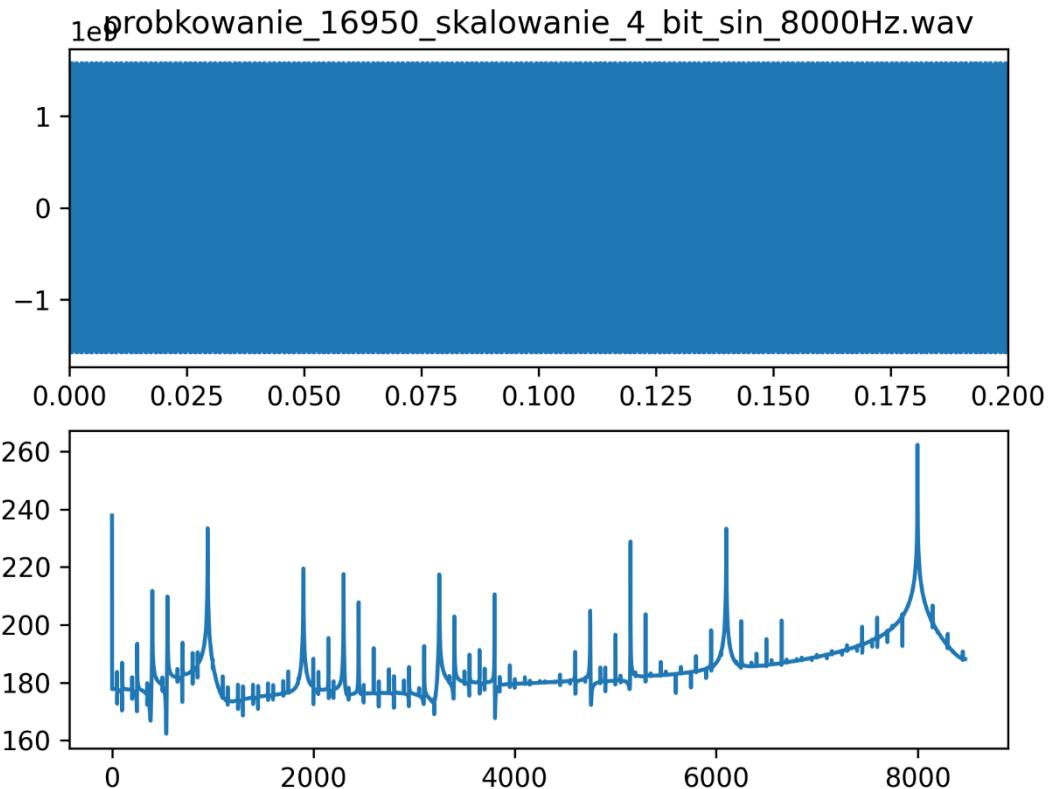
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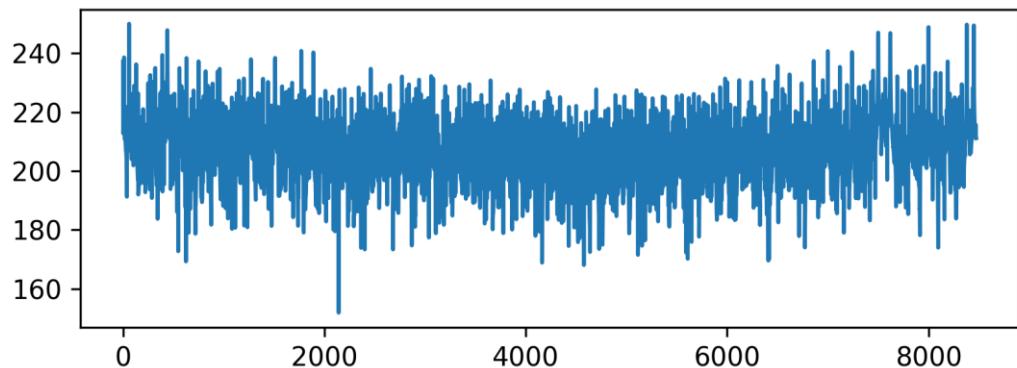
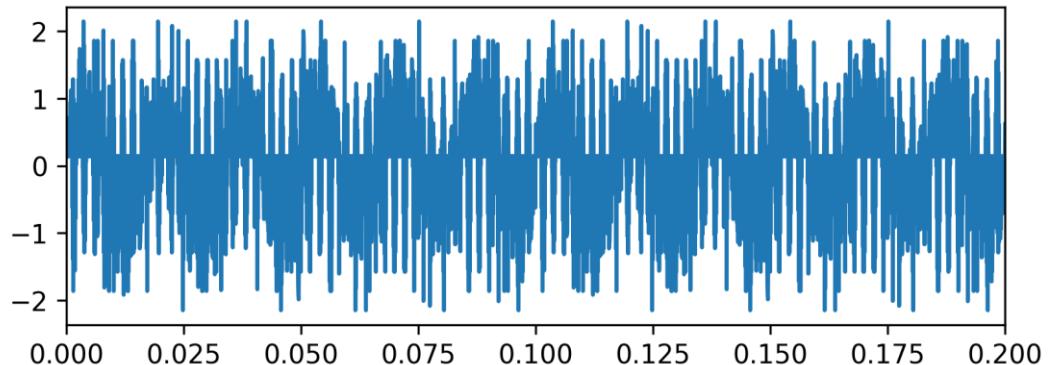
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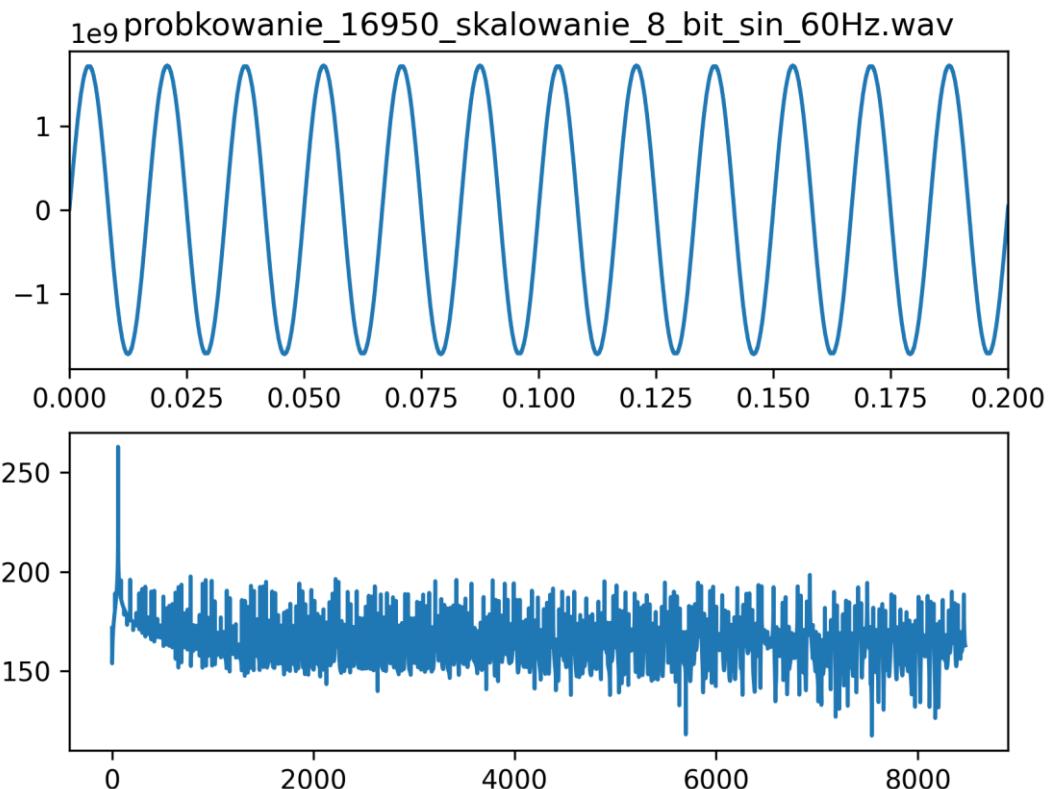
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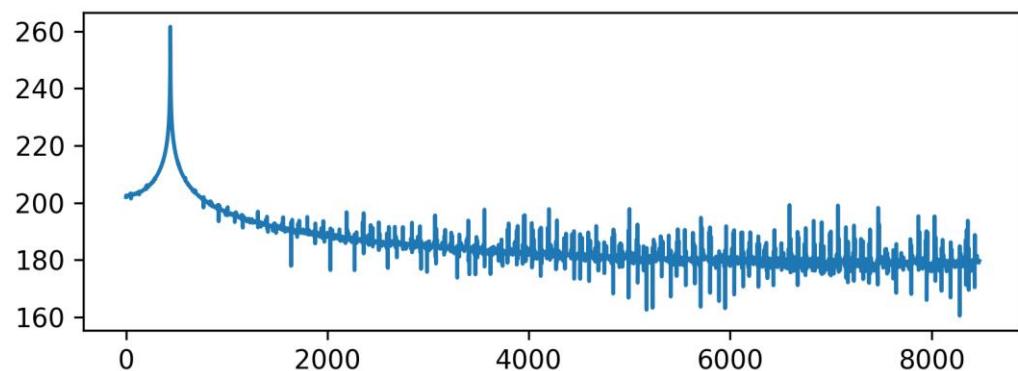
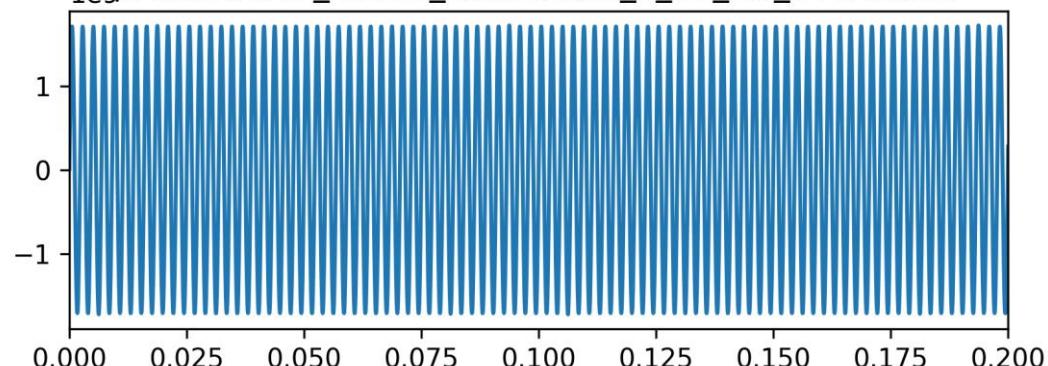
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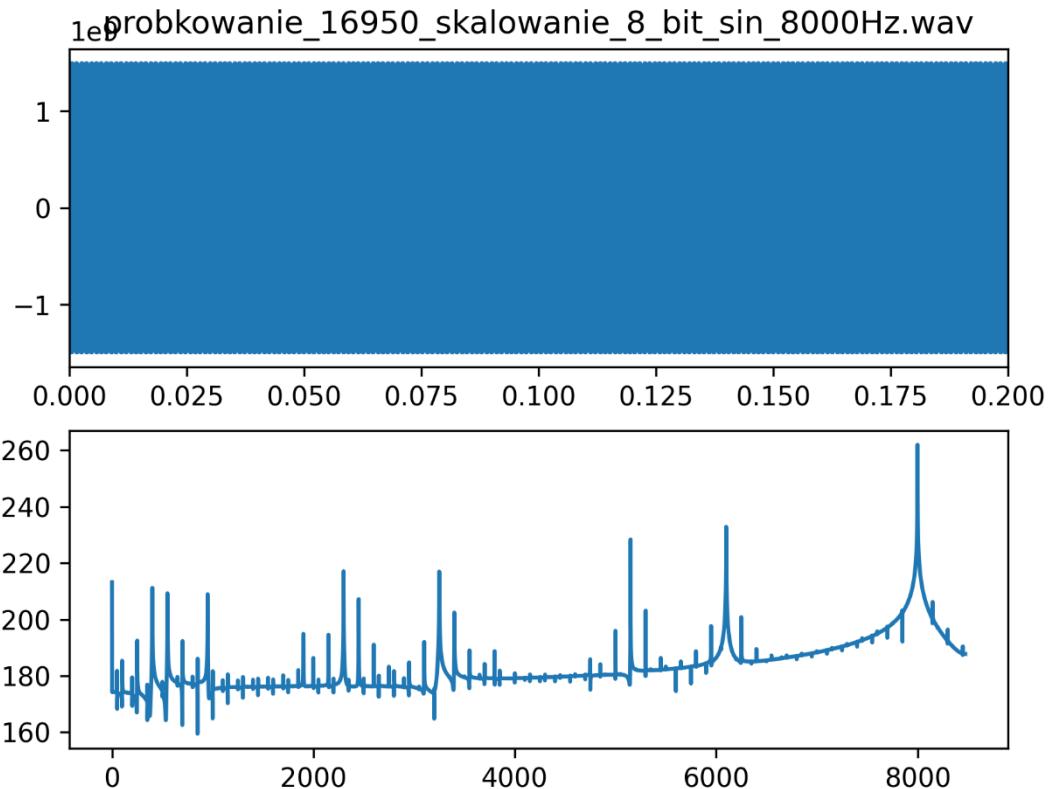
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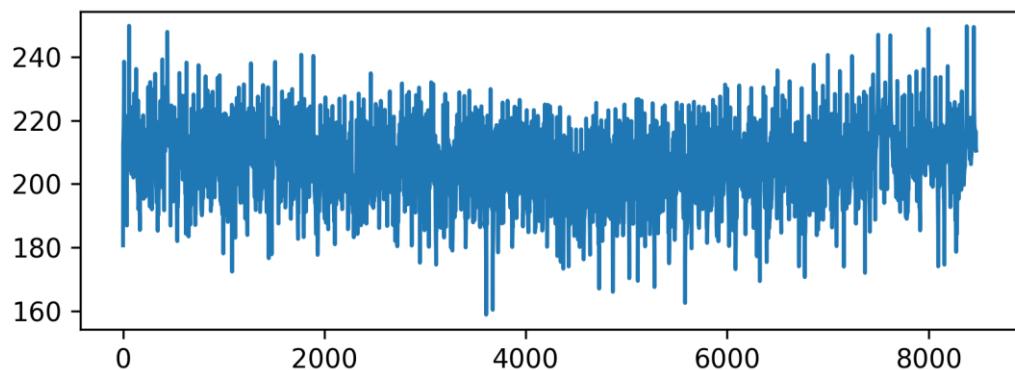
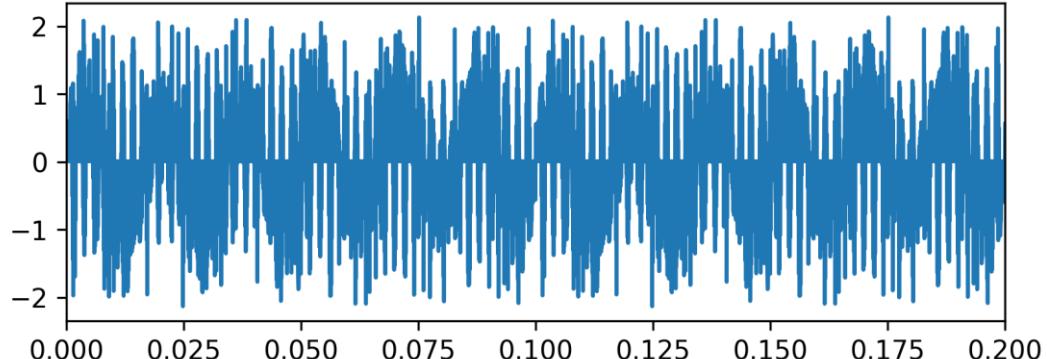
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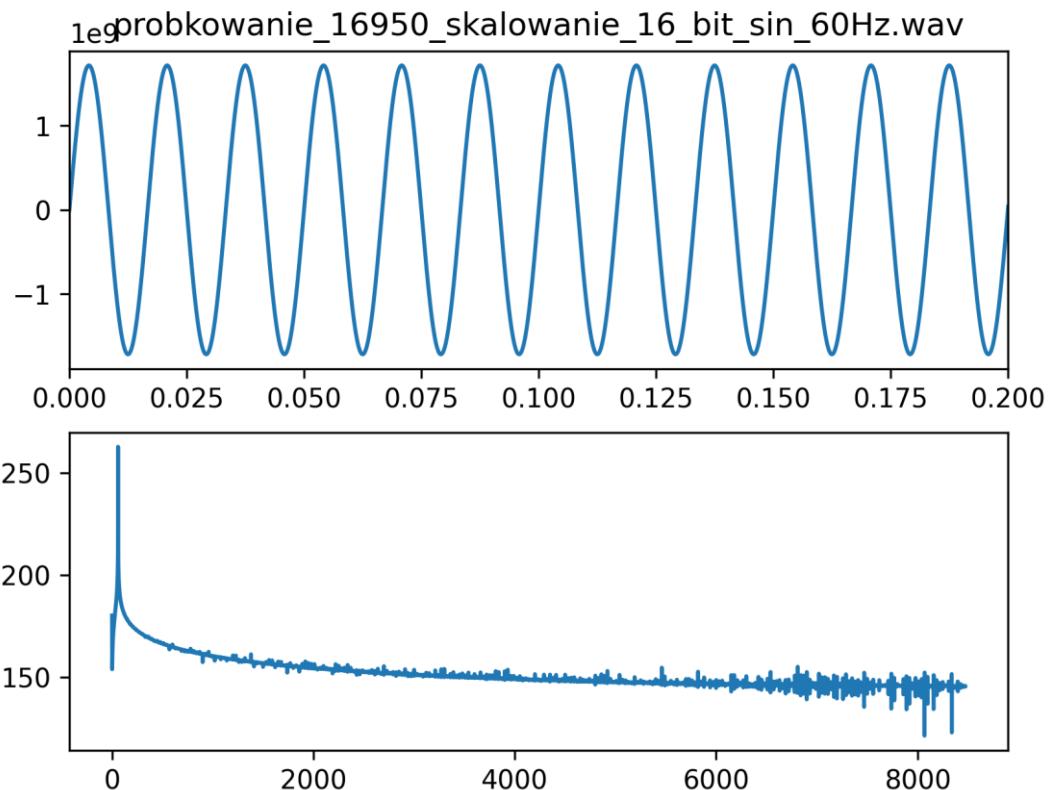
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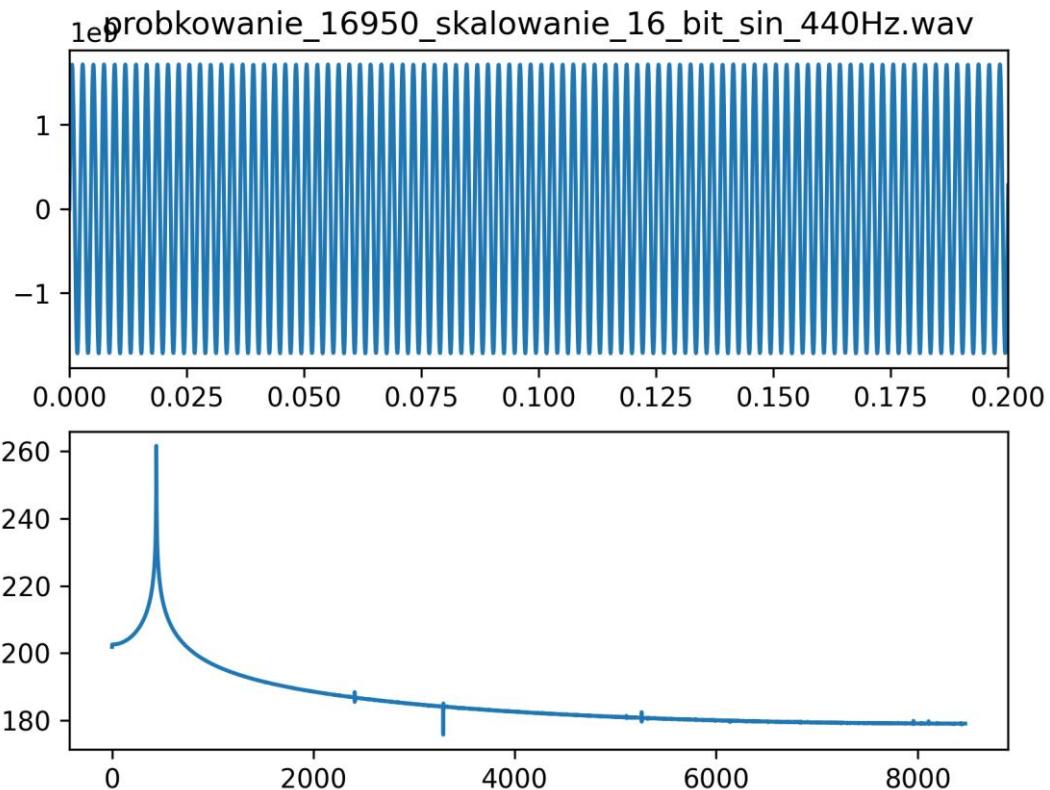
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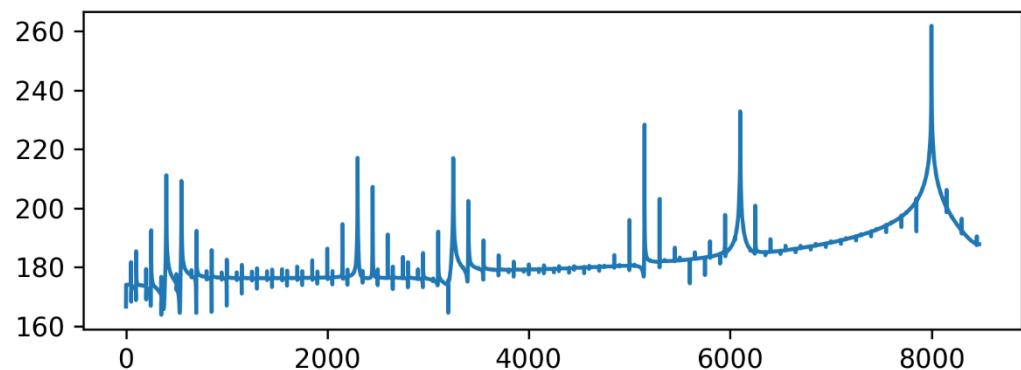
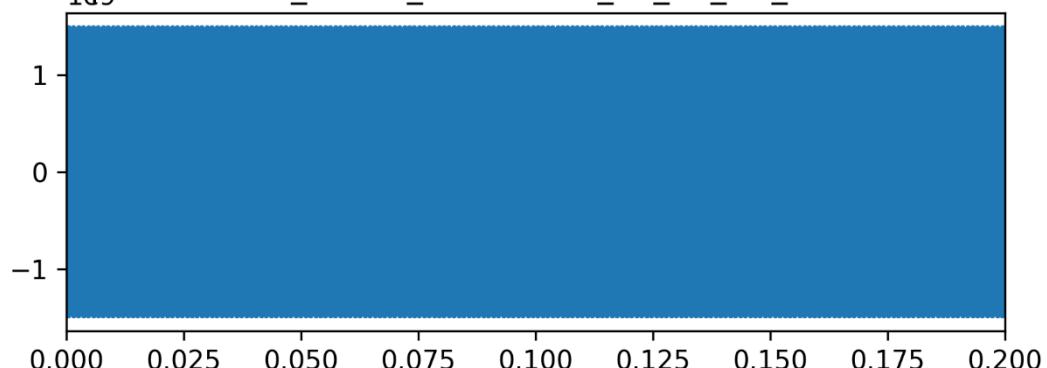
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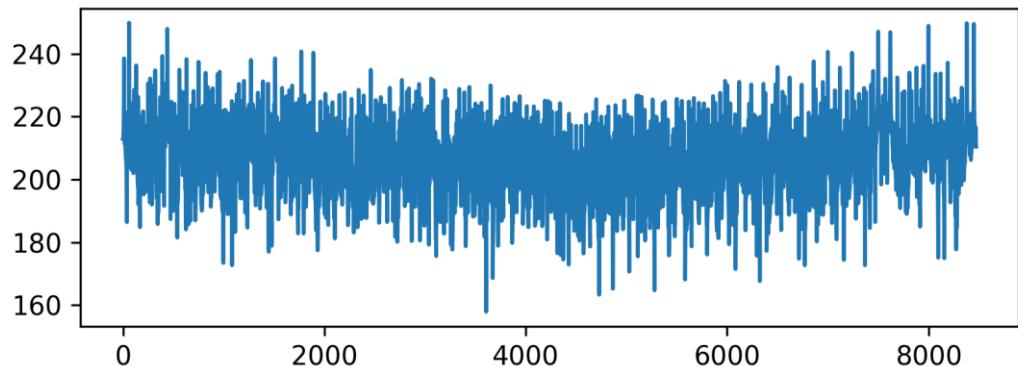
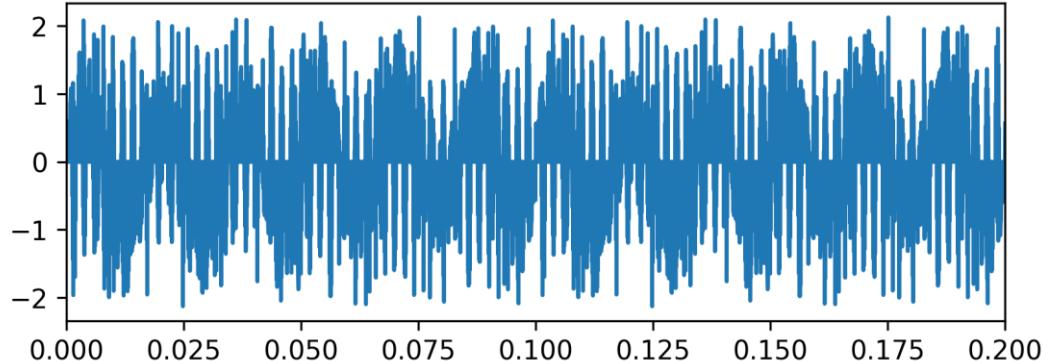
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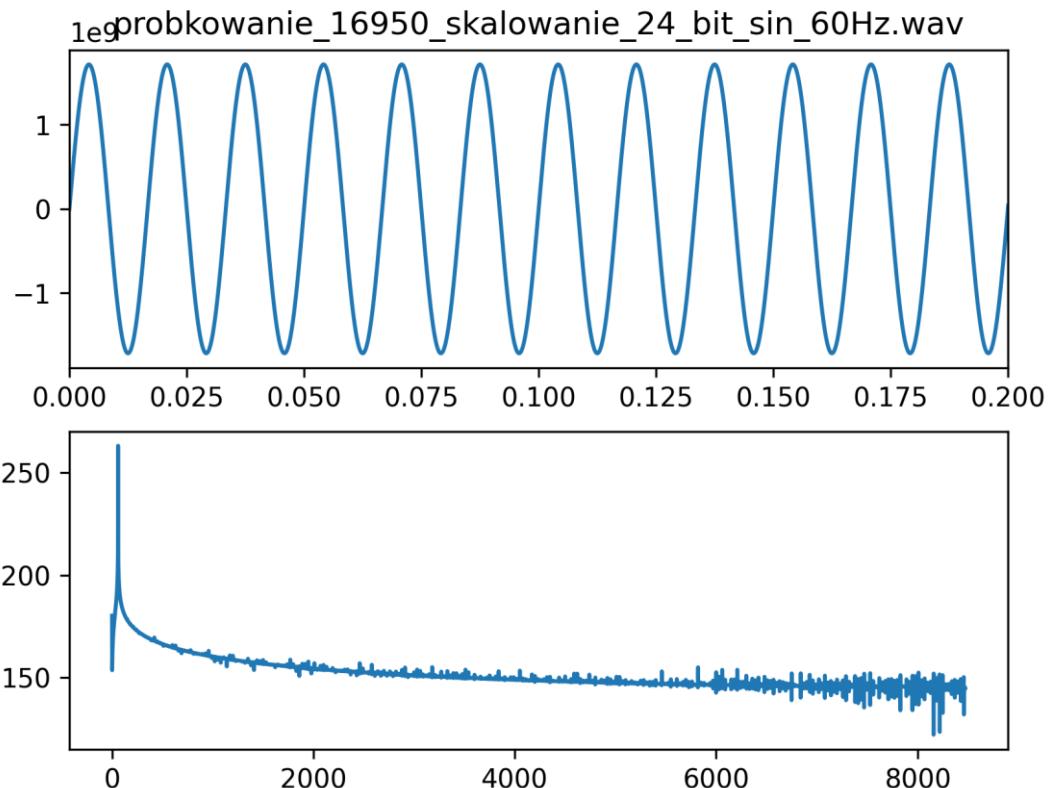
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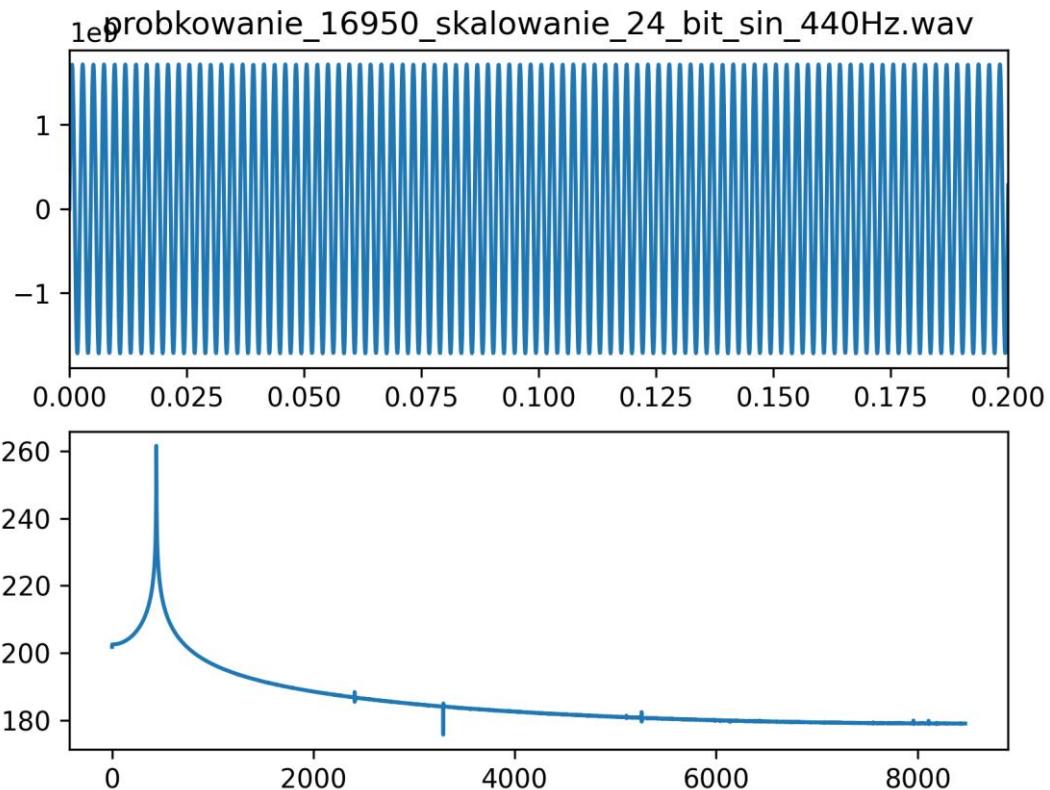
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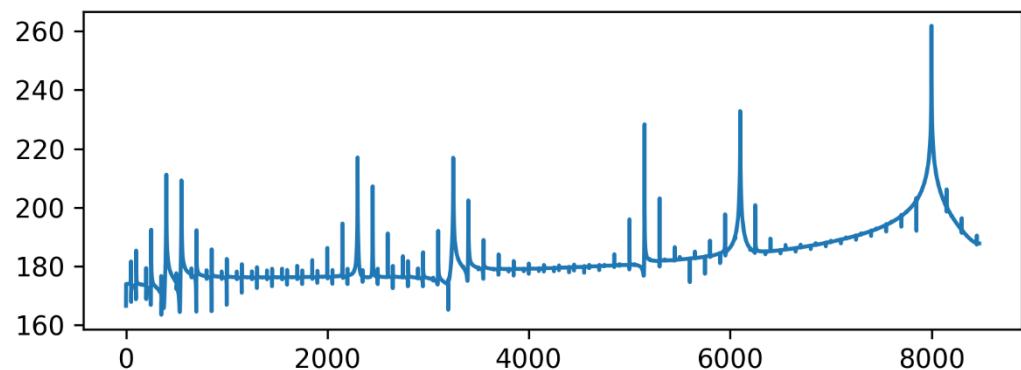
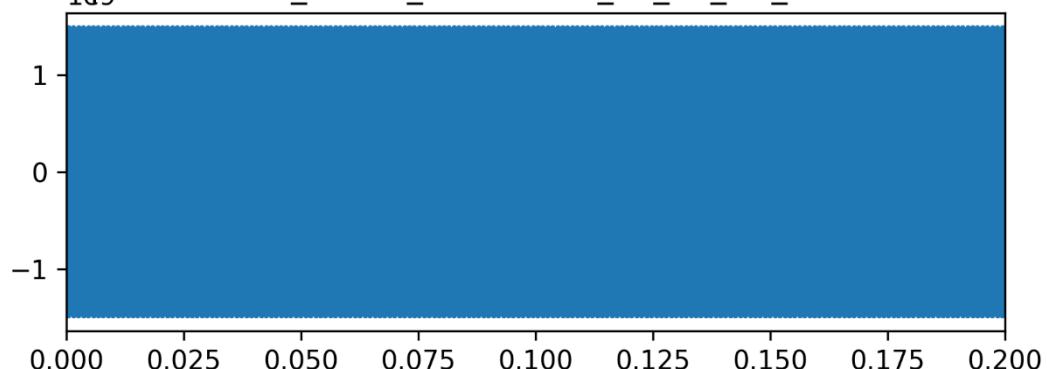
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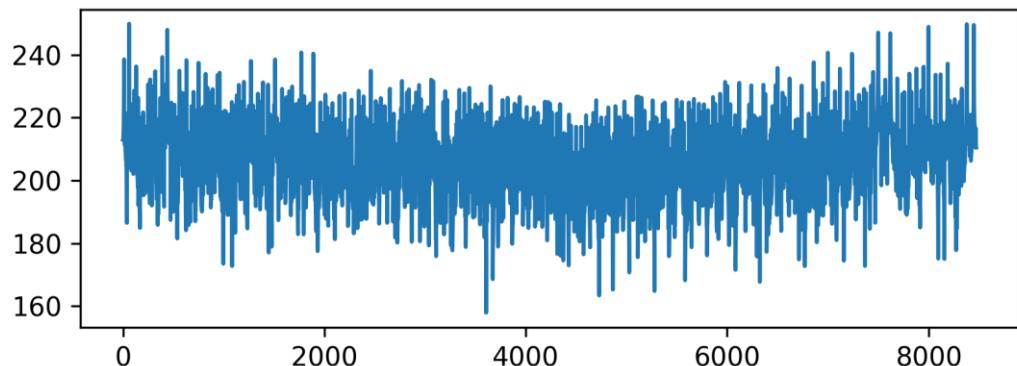
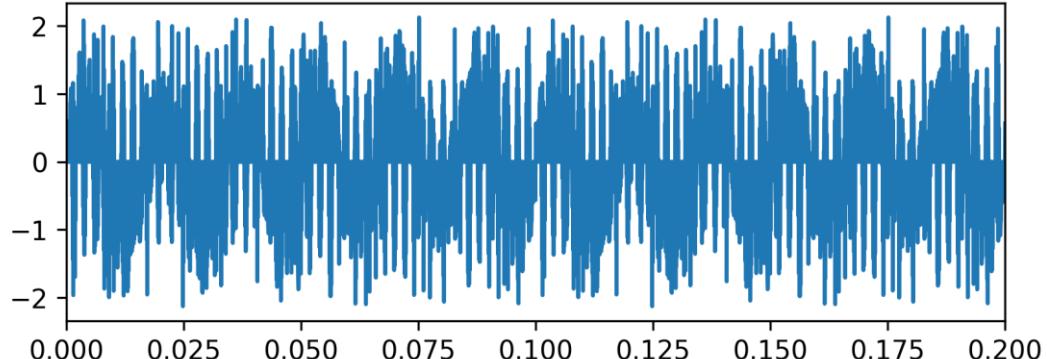
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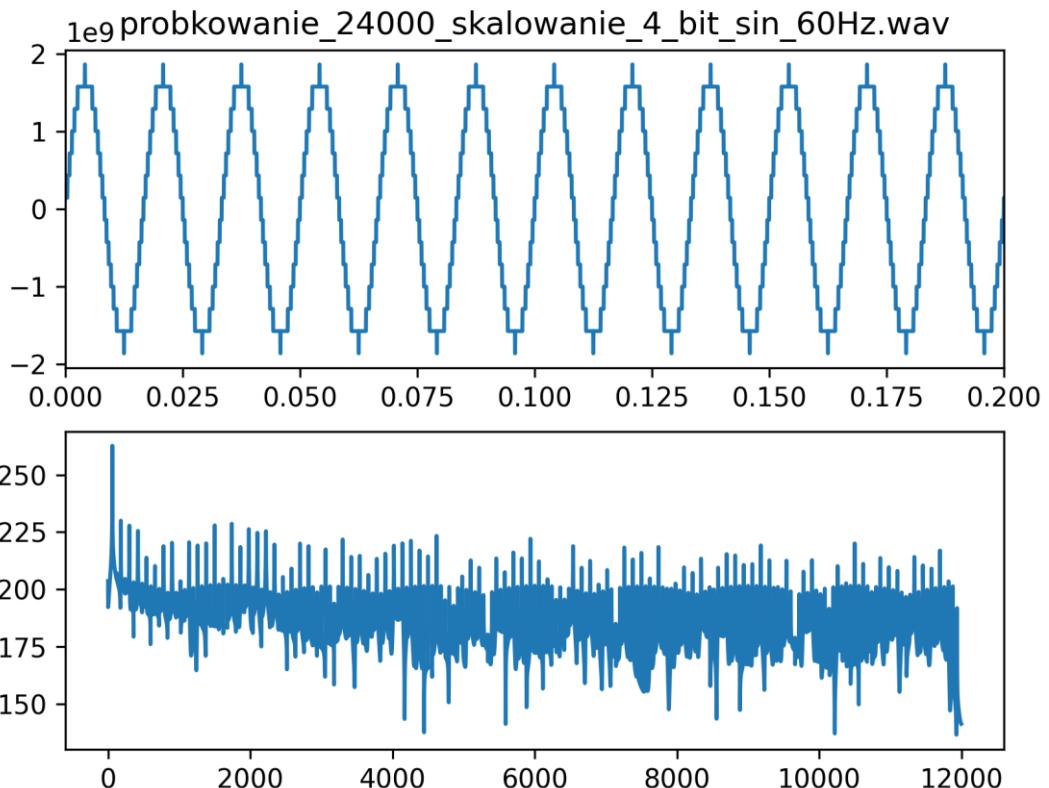
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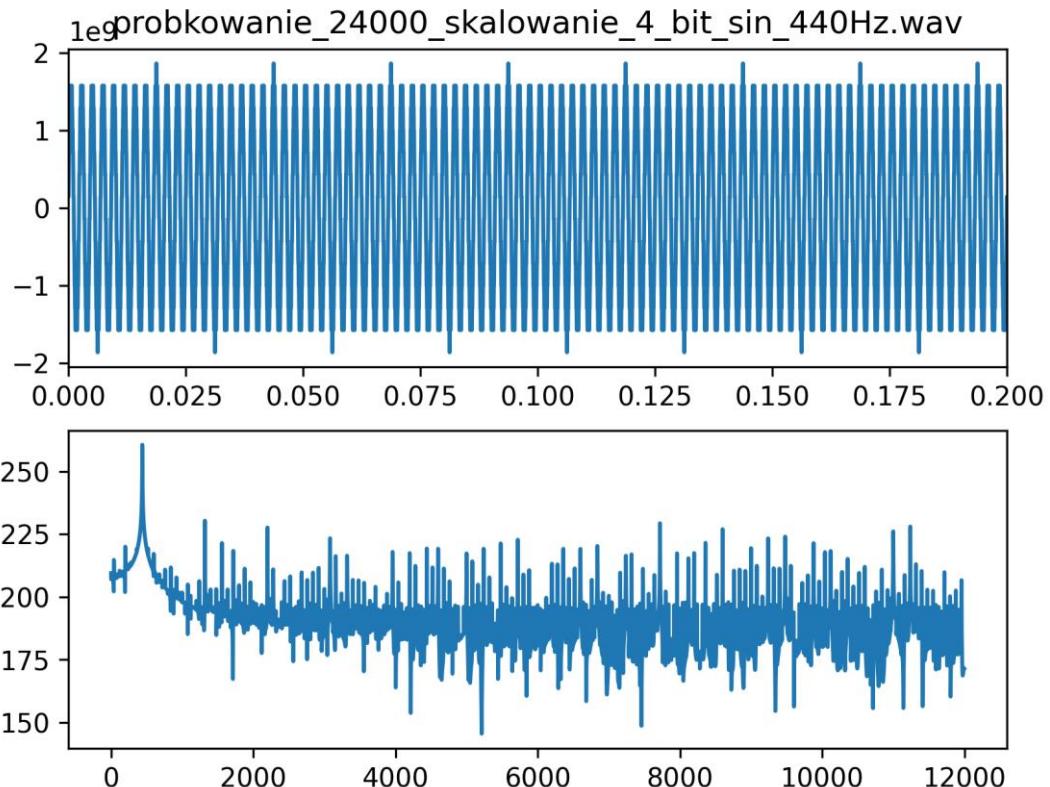
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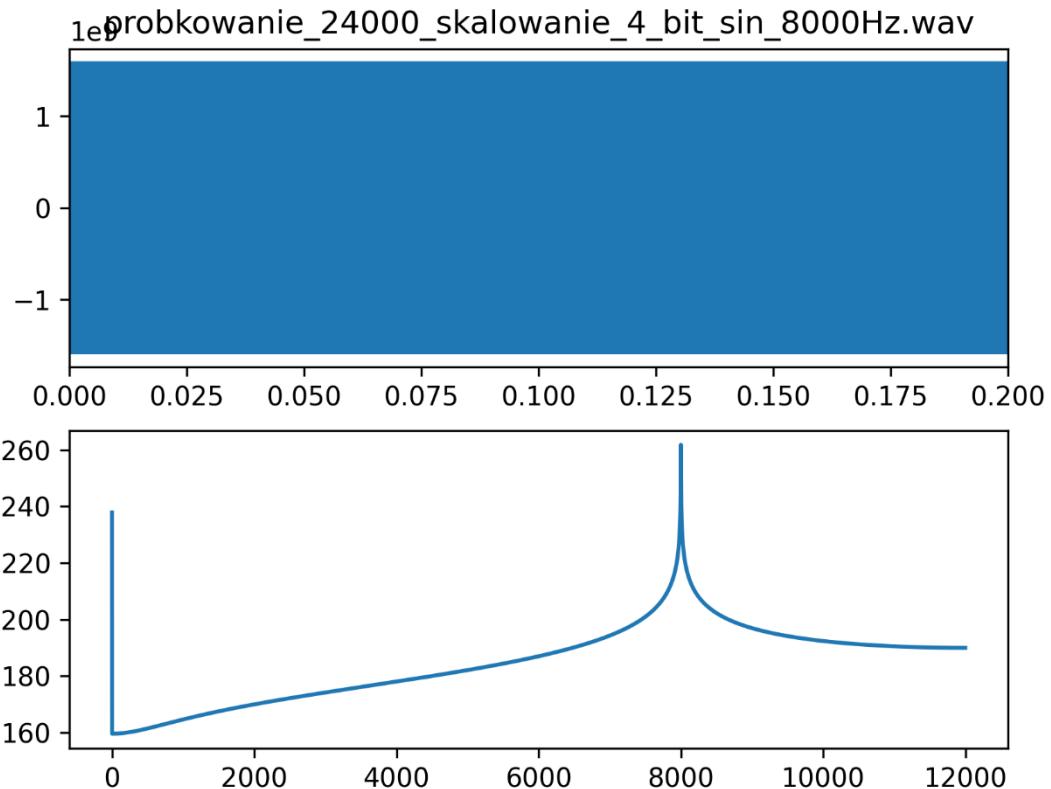
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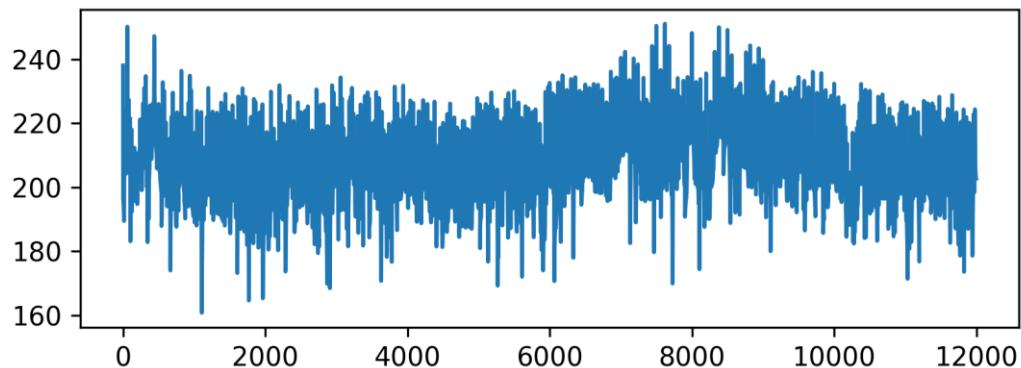
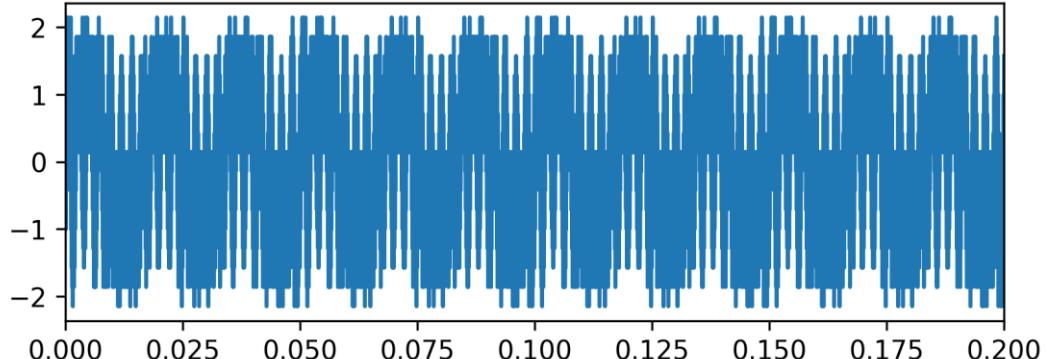
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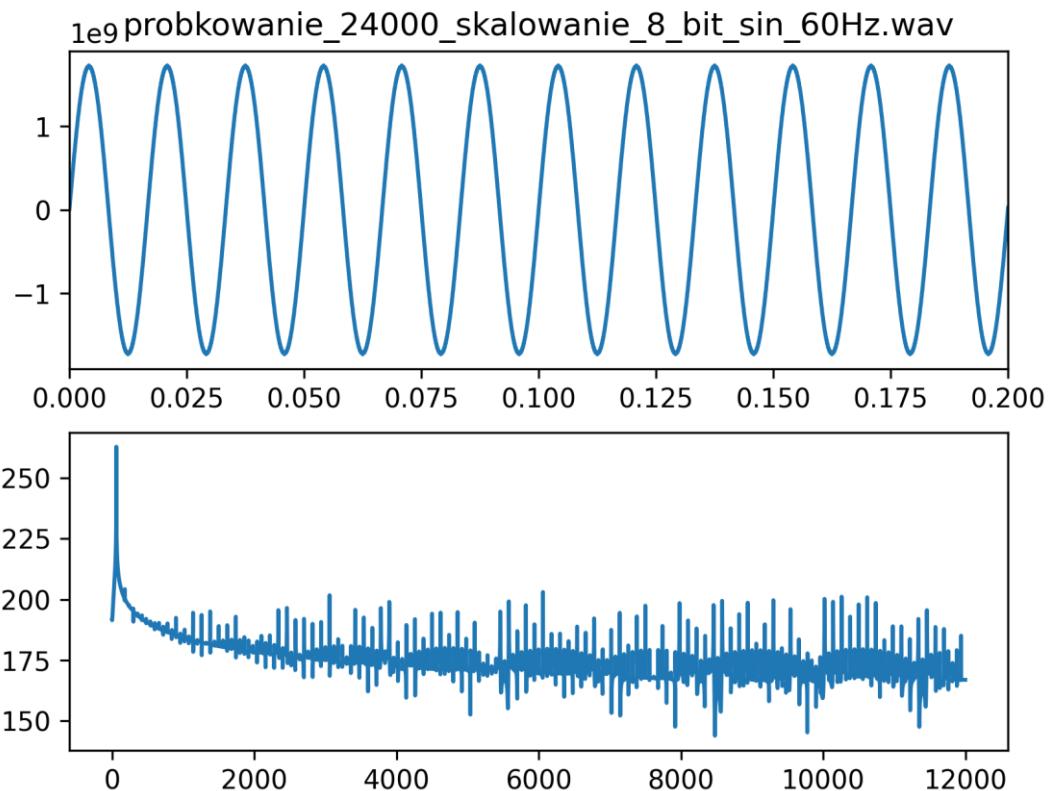
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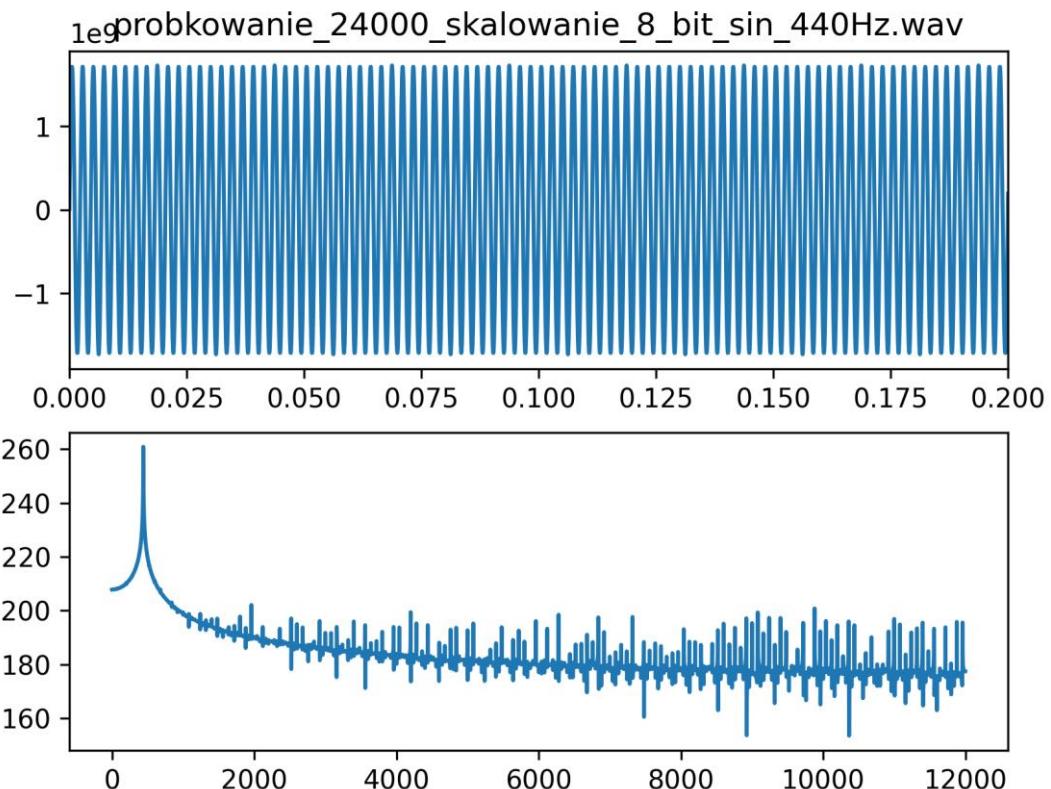
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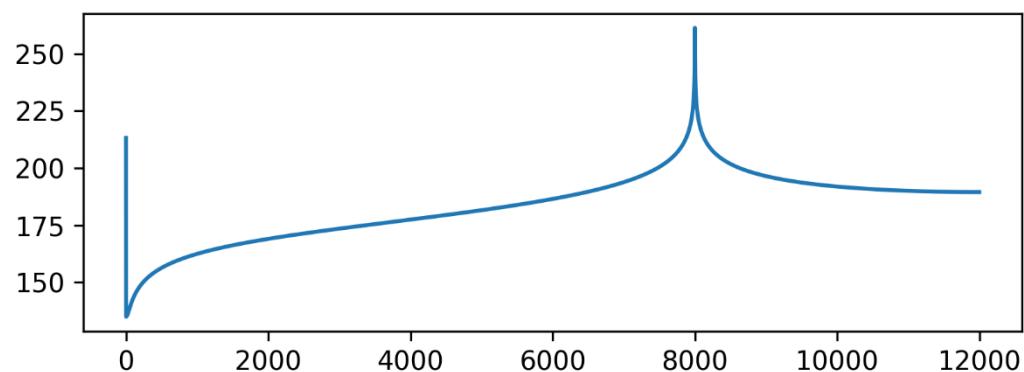
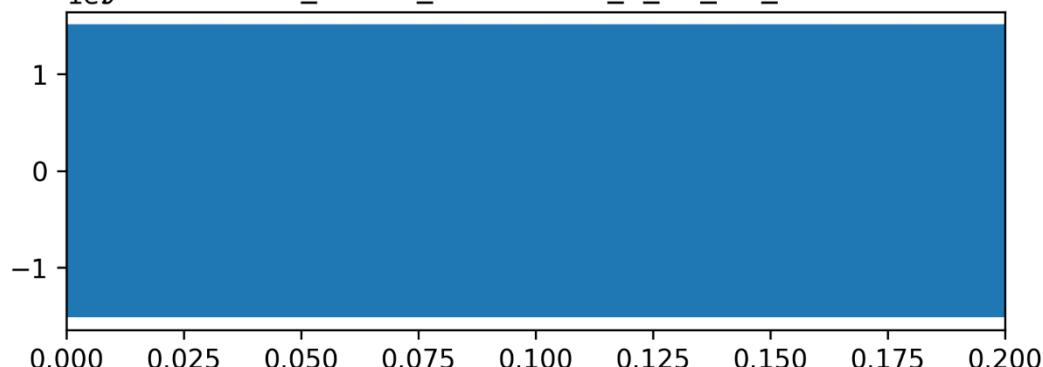
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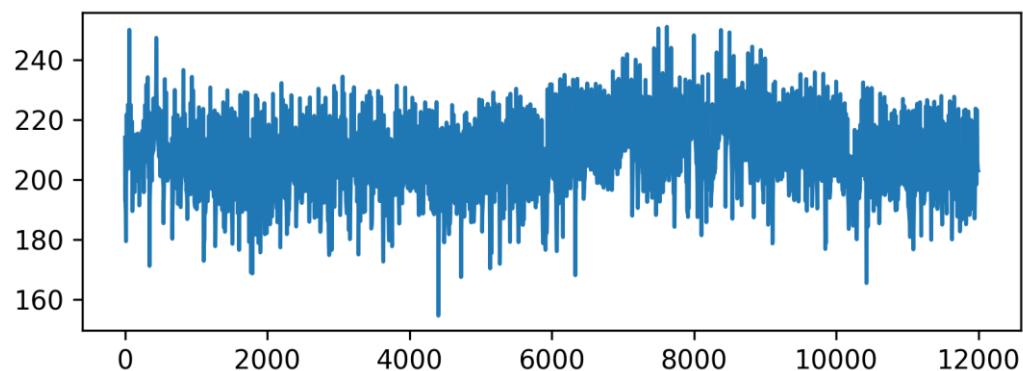
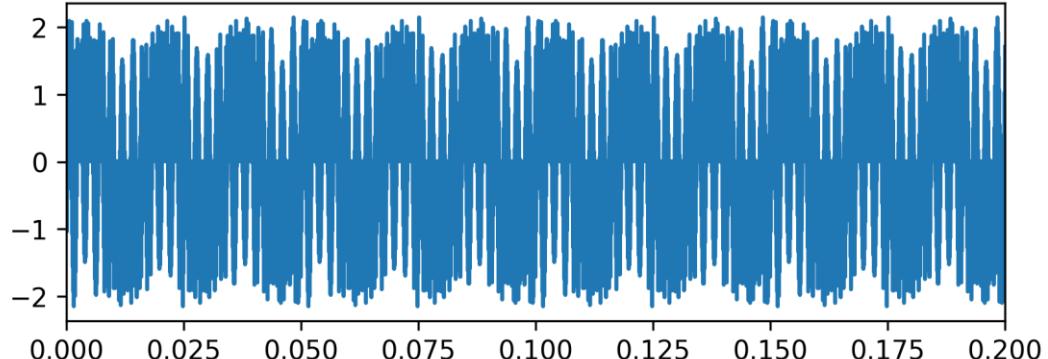
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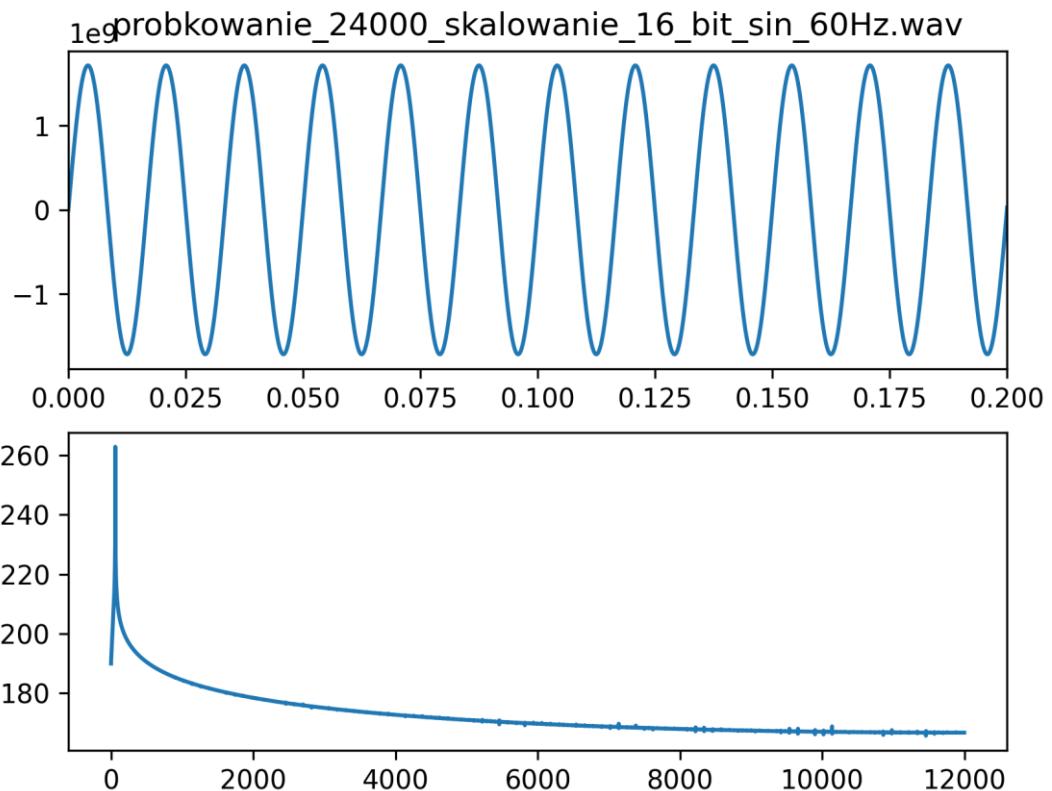


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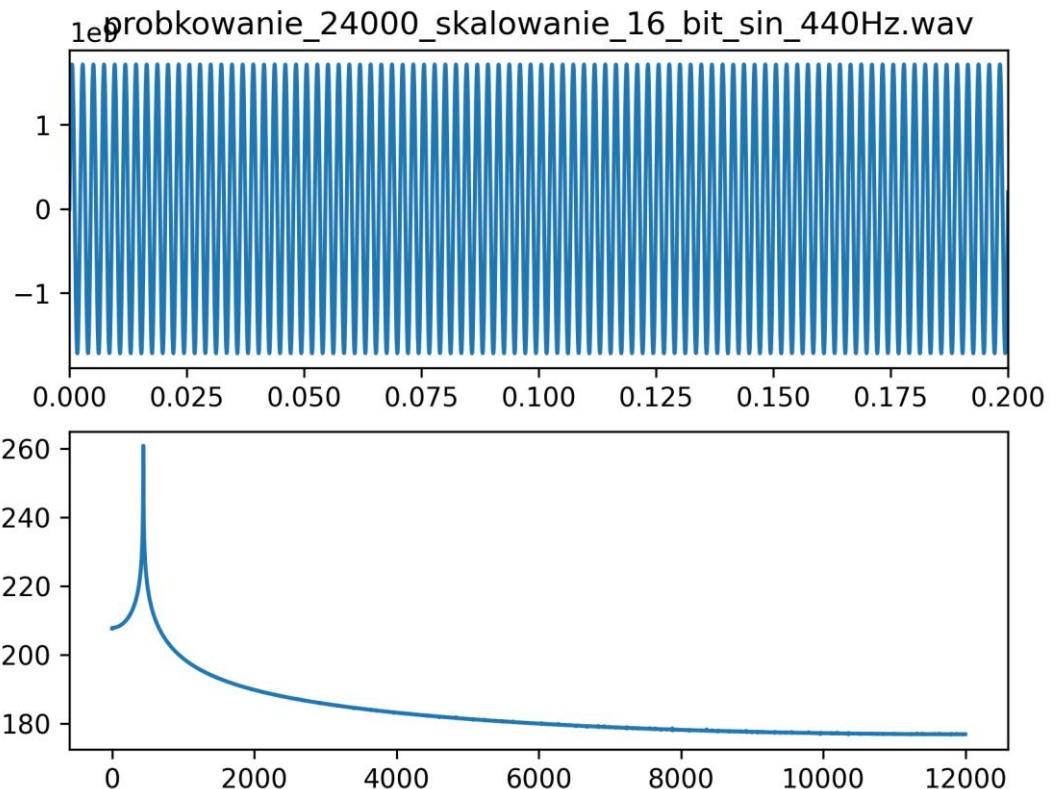
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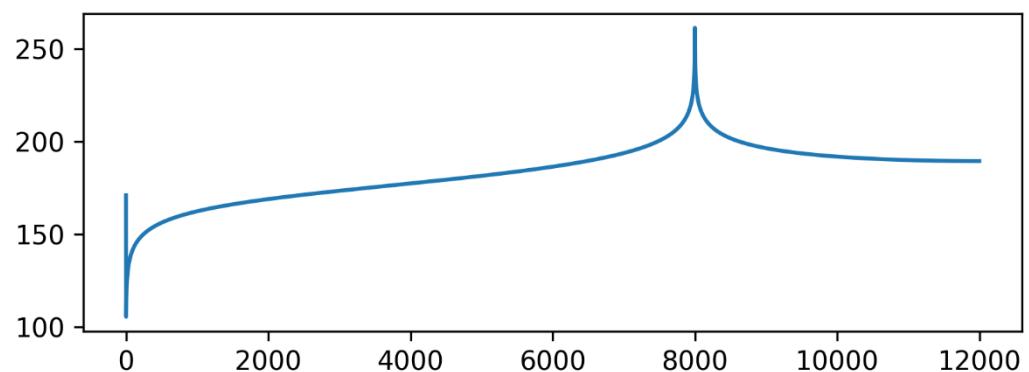
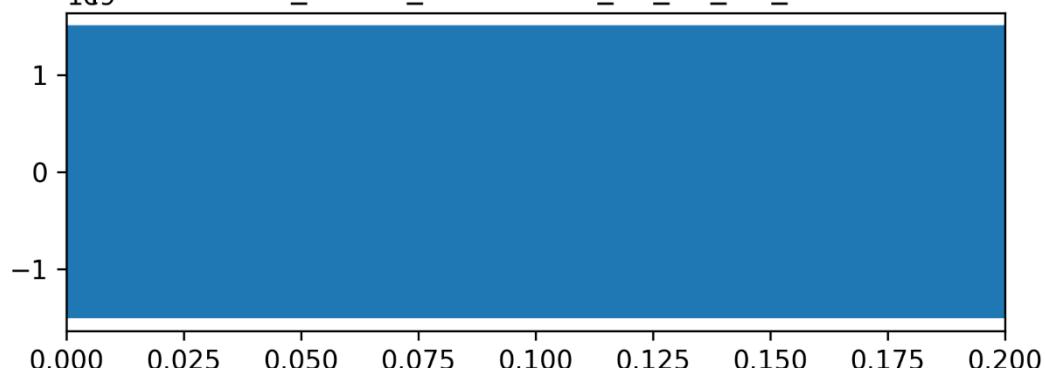
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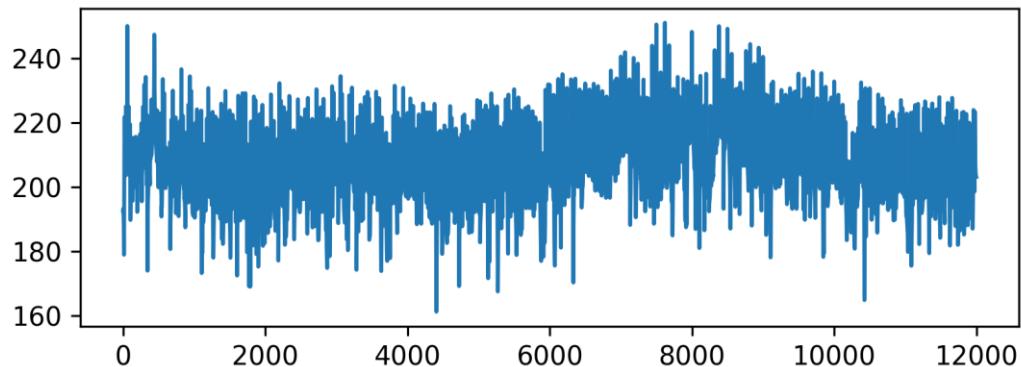
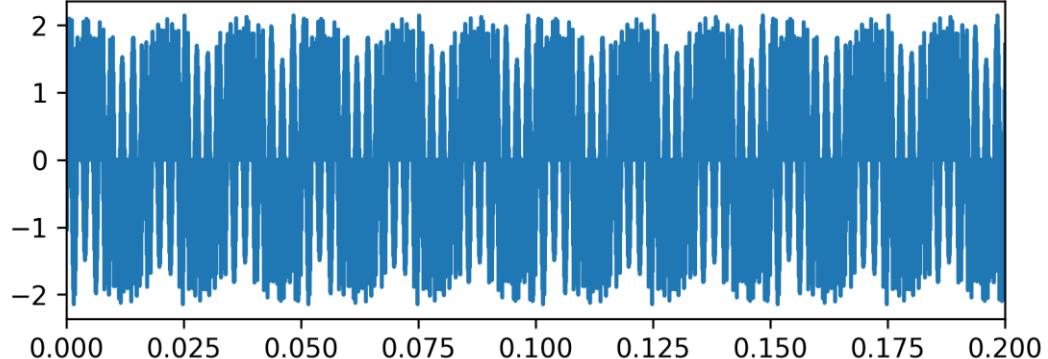
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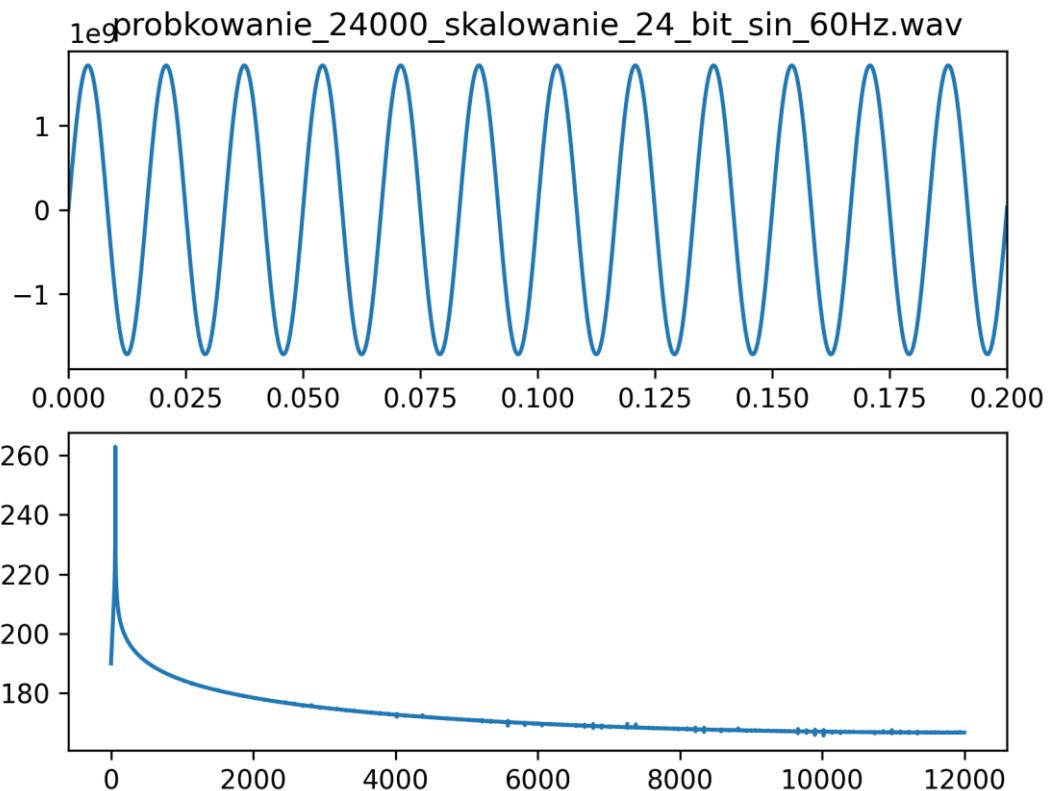


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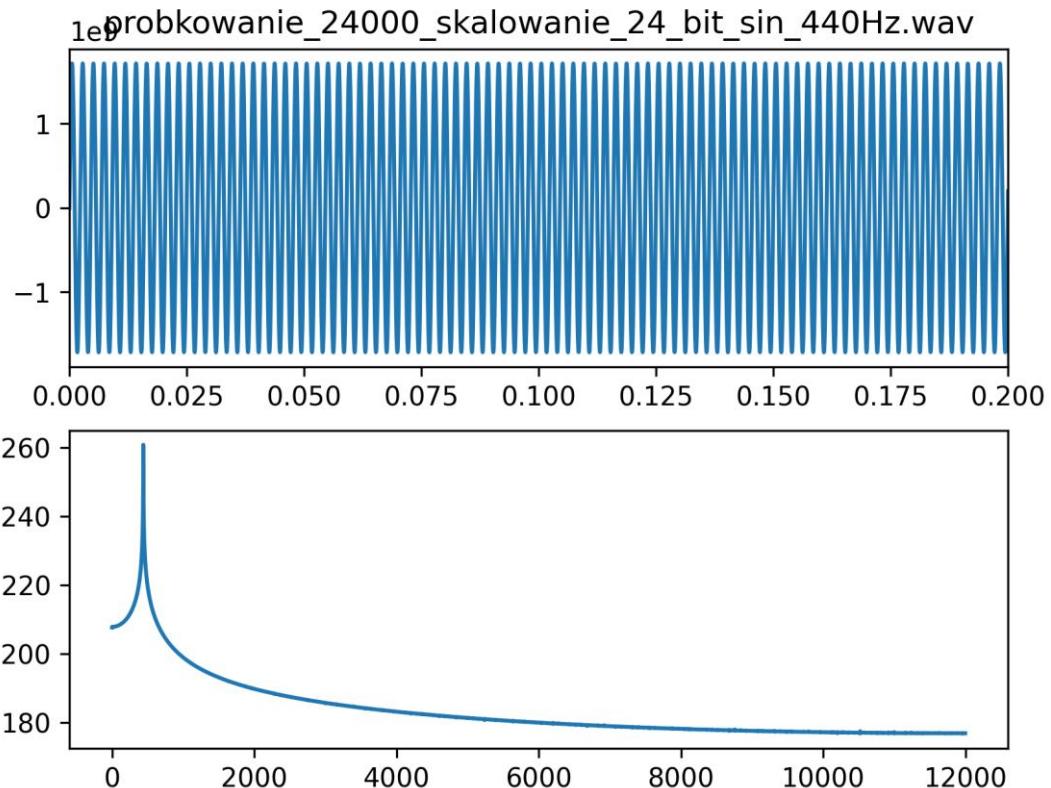
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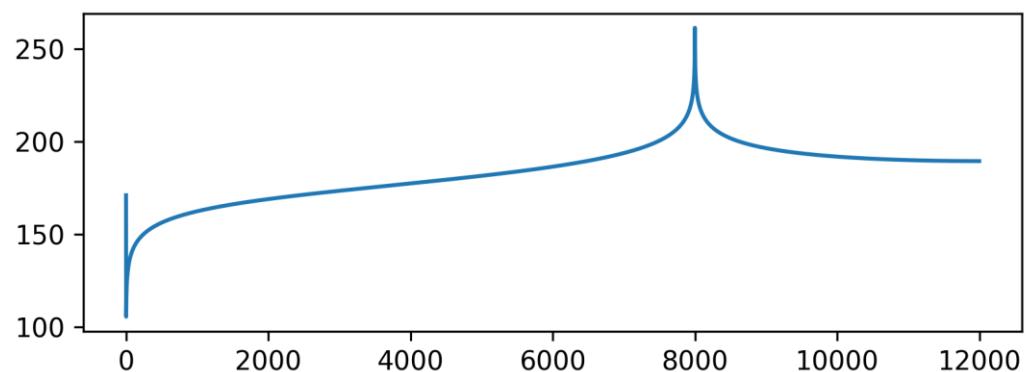
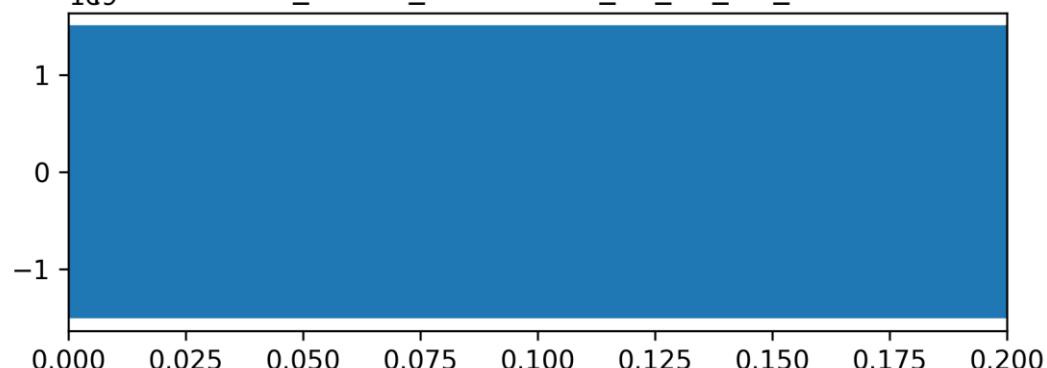
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Ratańczuk Sebastian rs44476

gr321

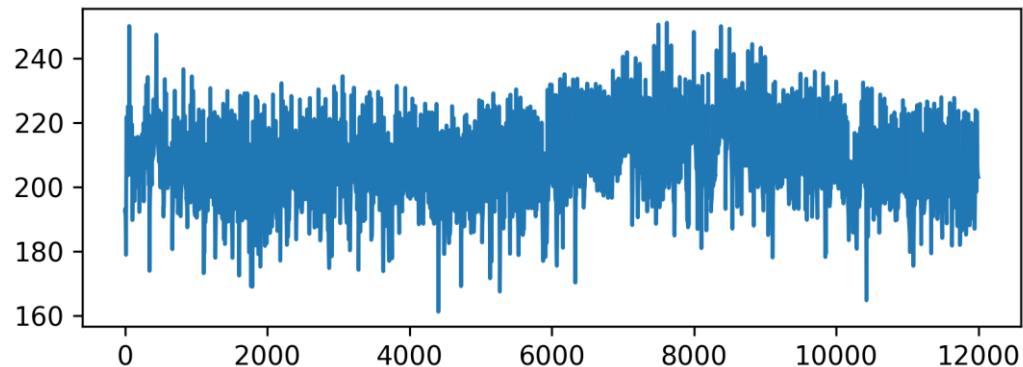
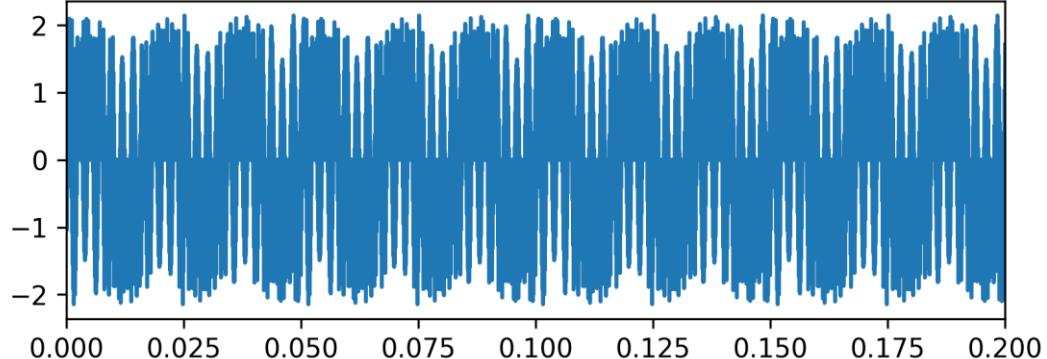
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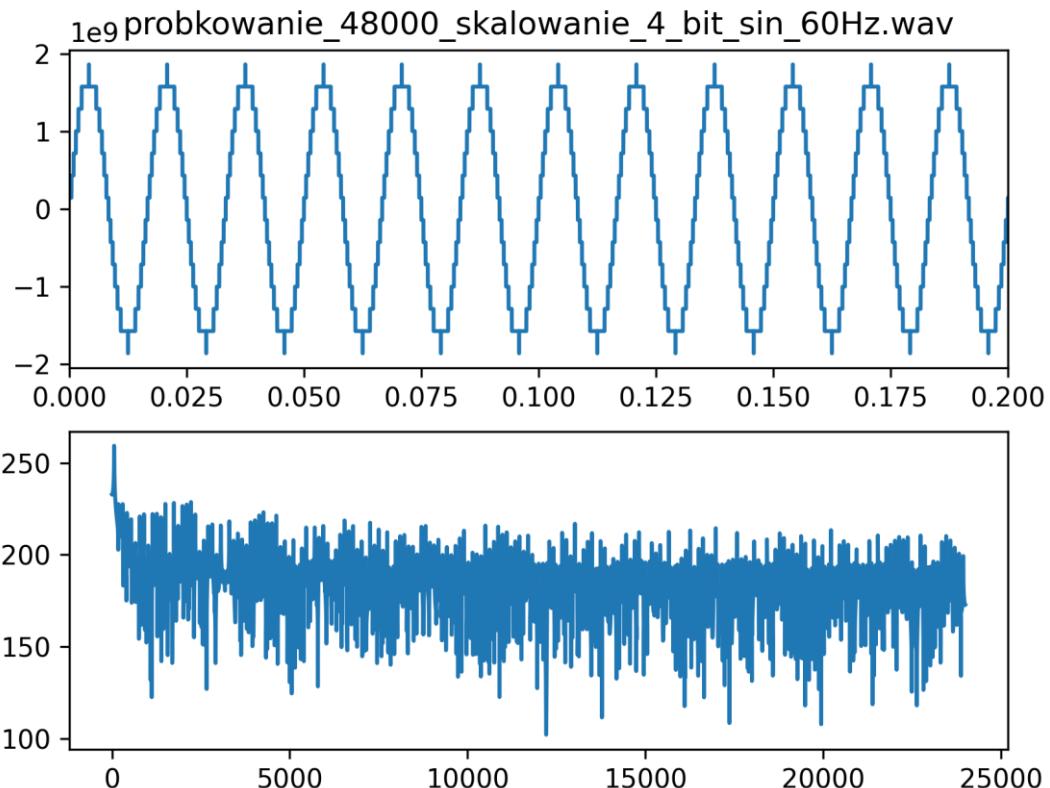
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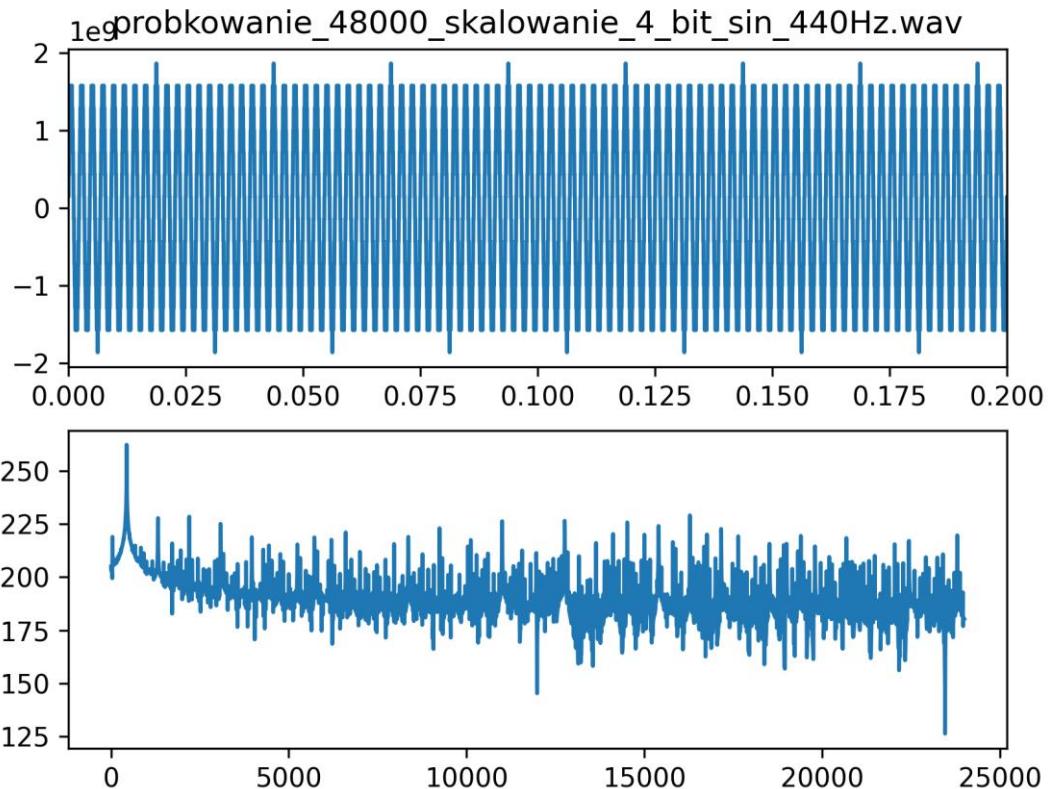
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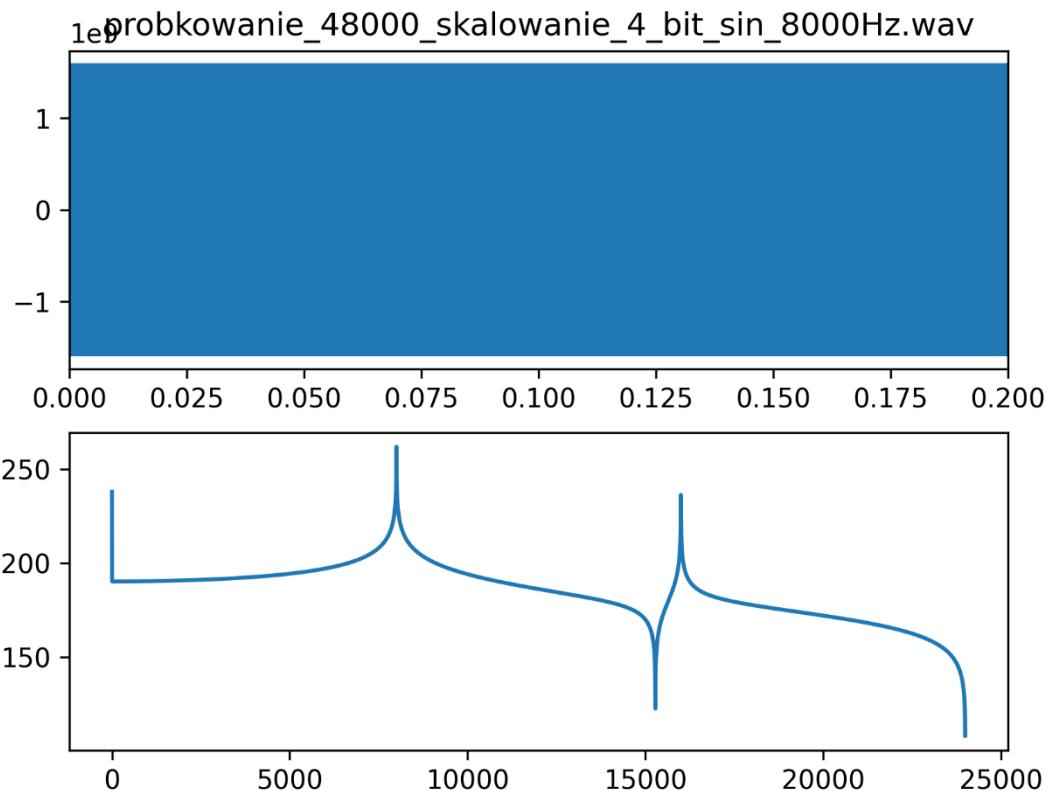
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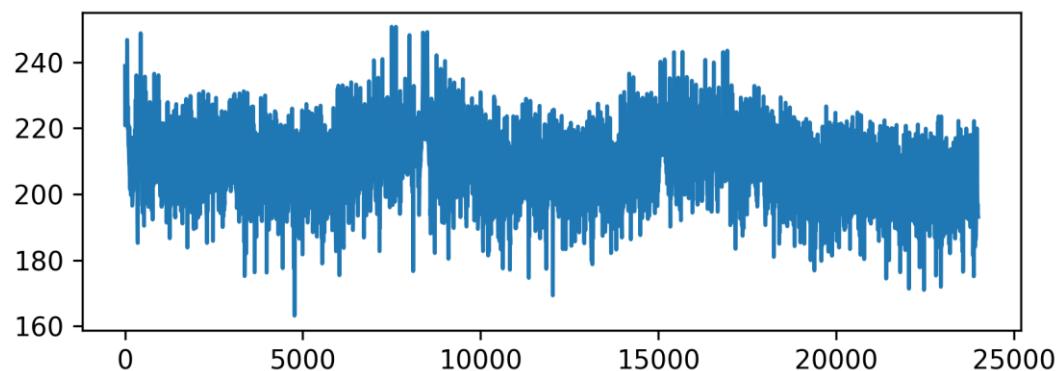
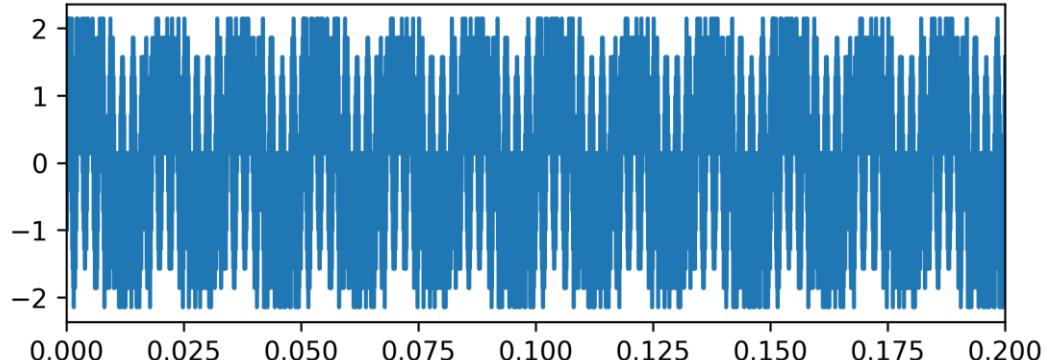
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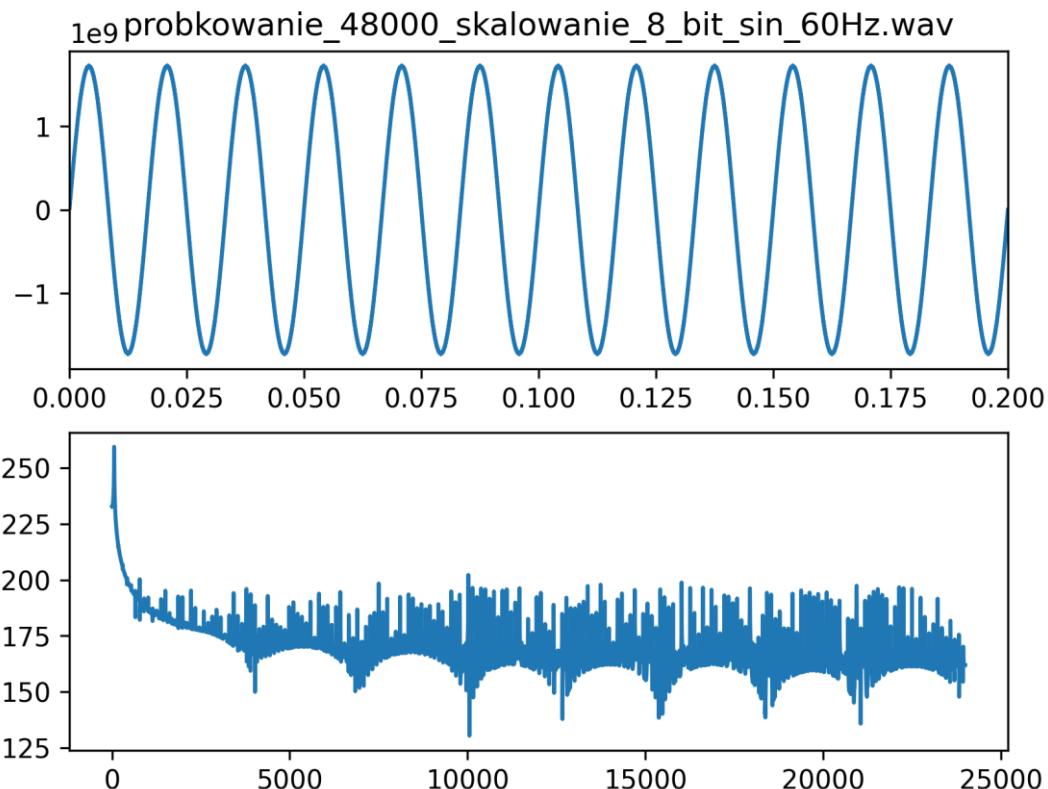
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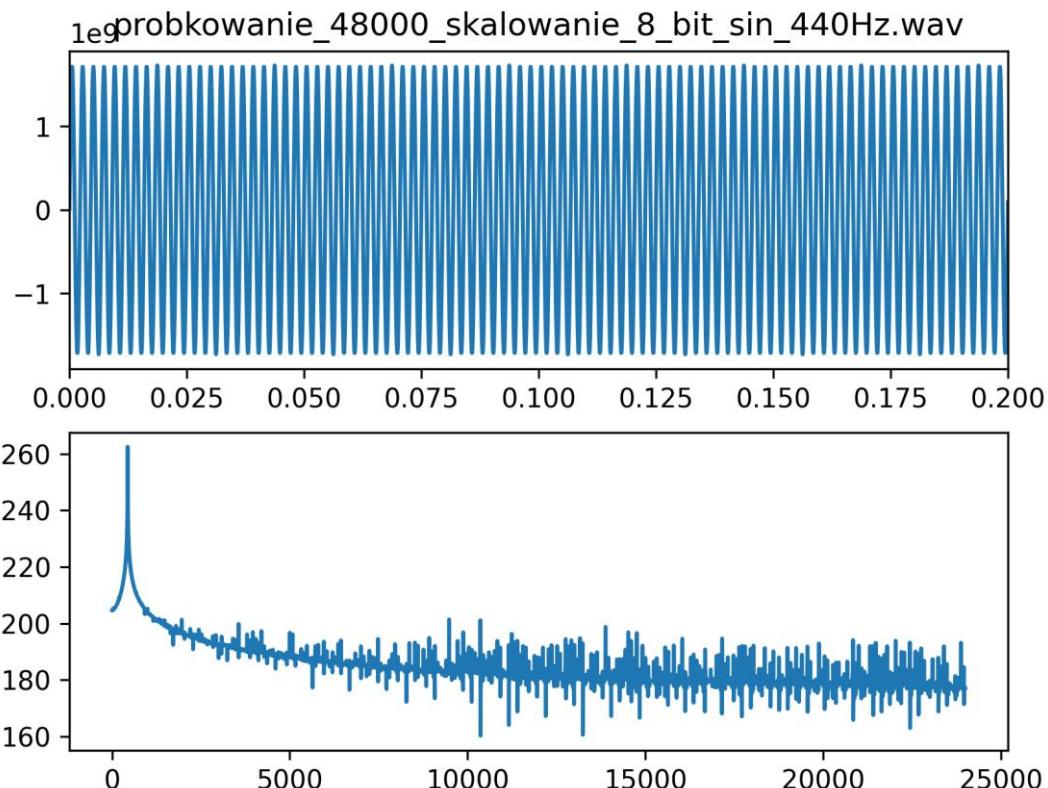
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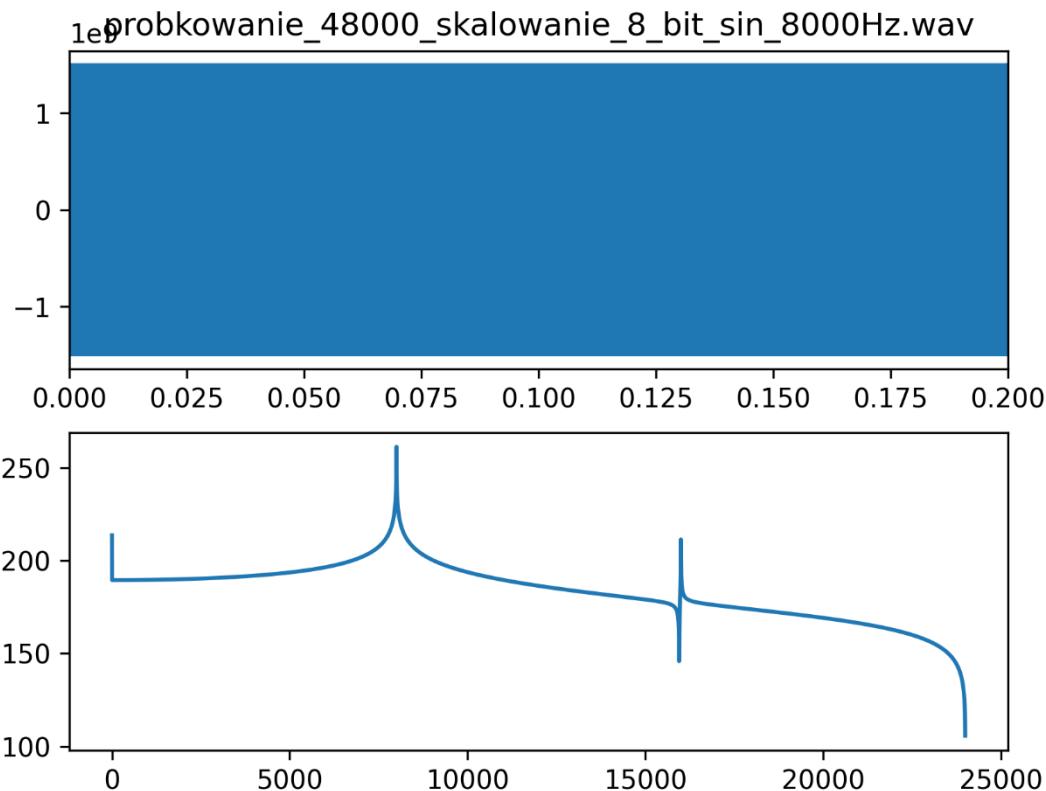
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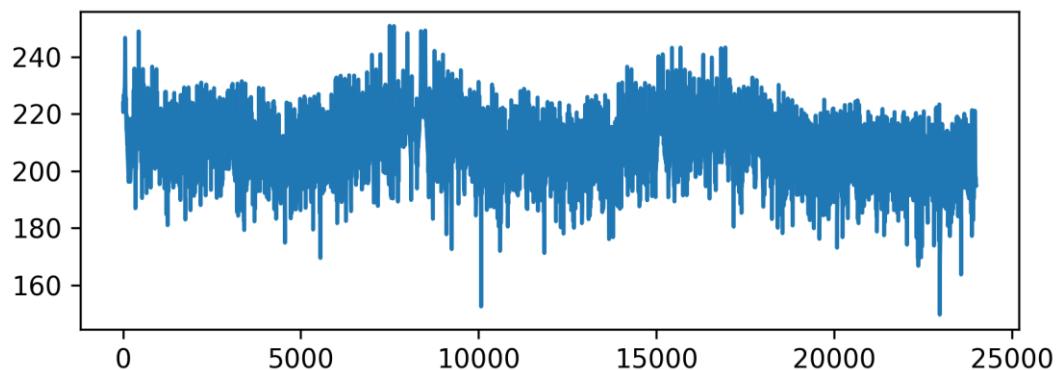
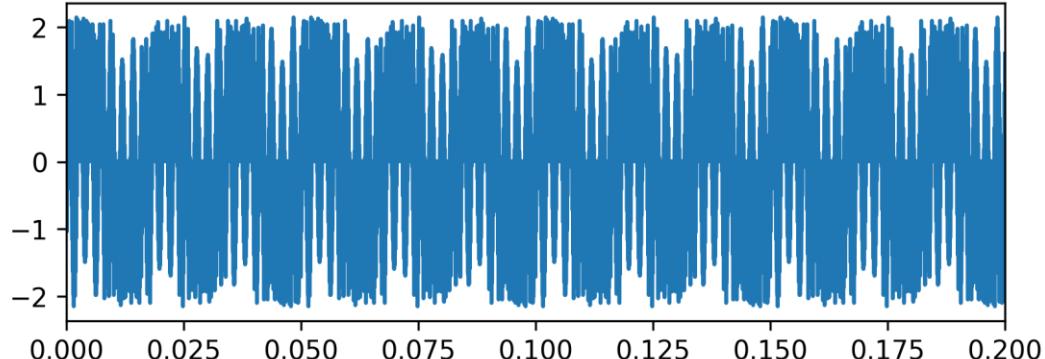
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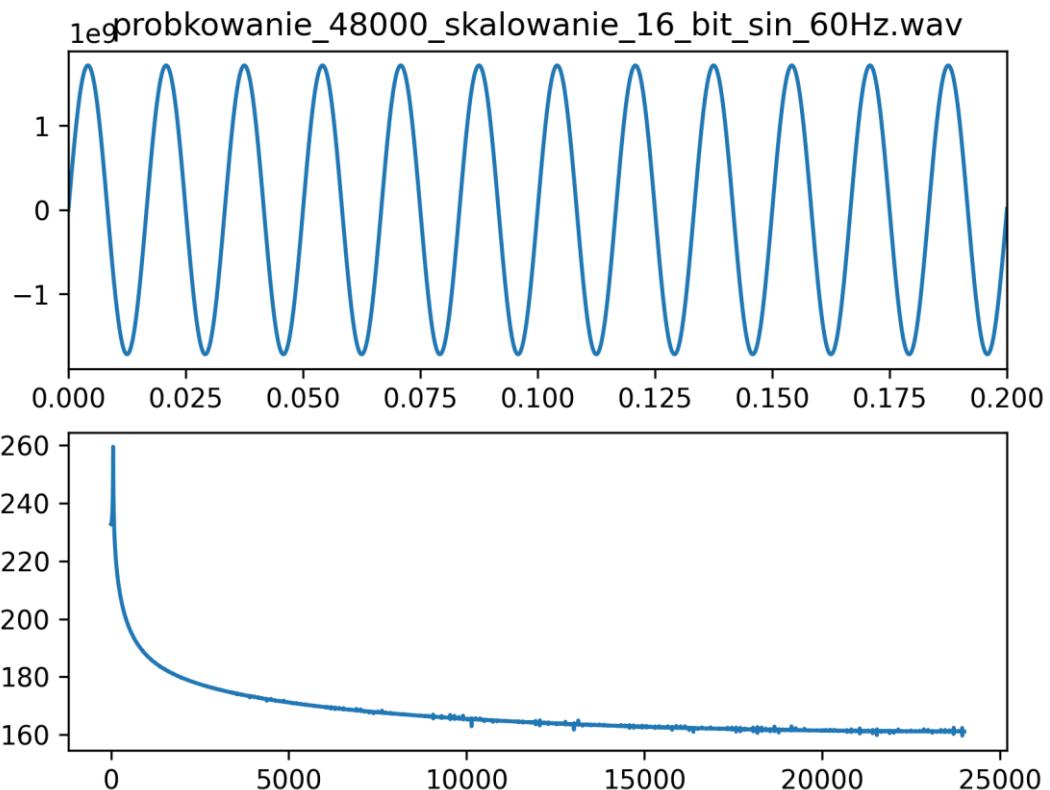
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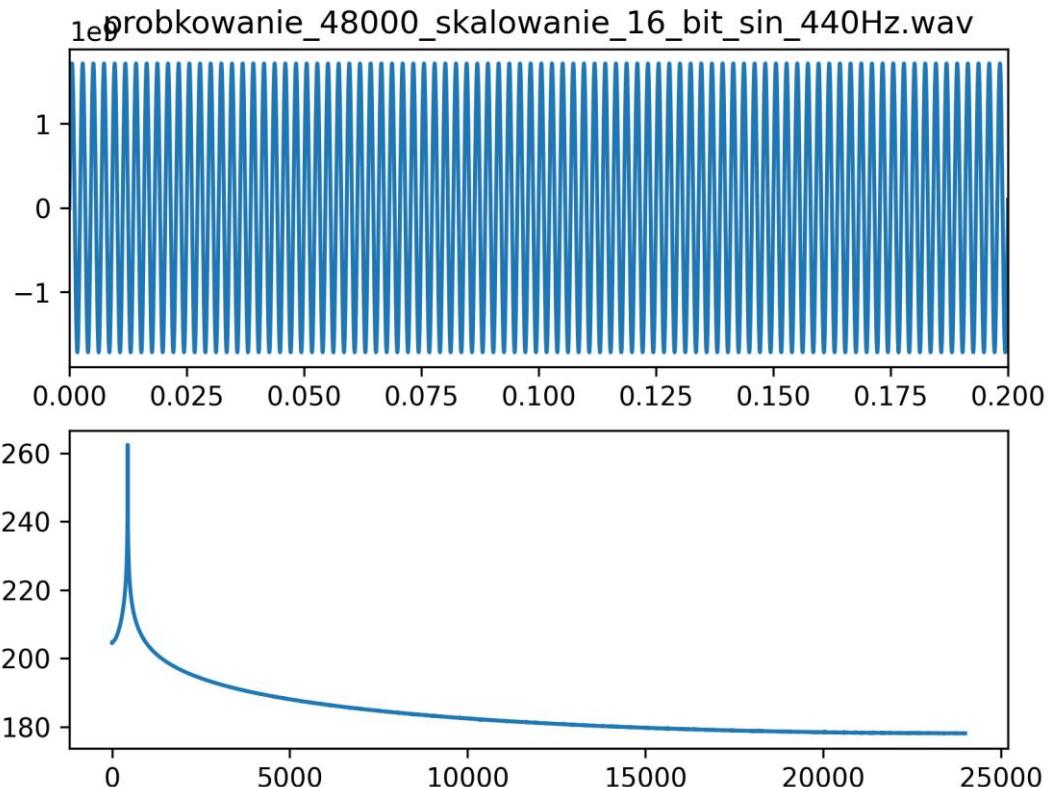
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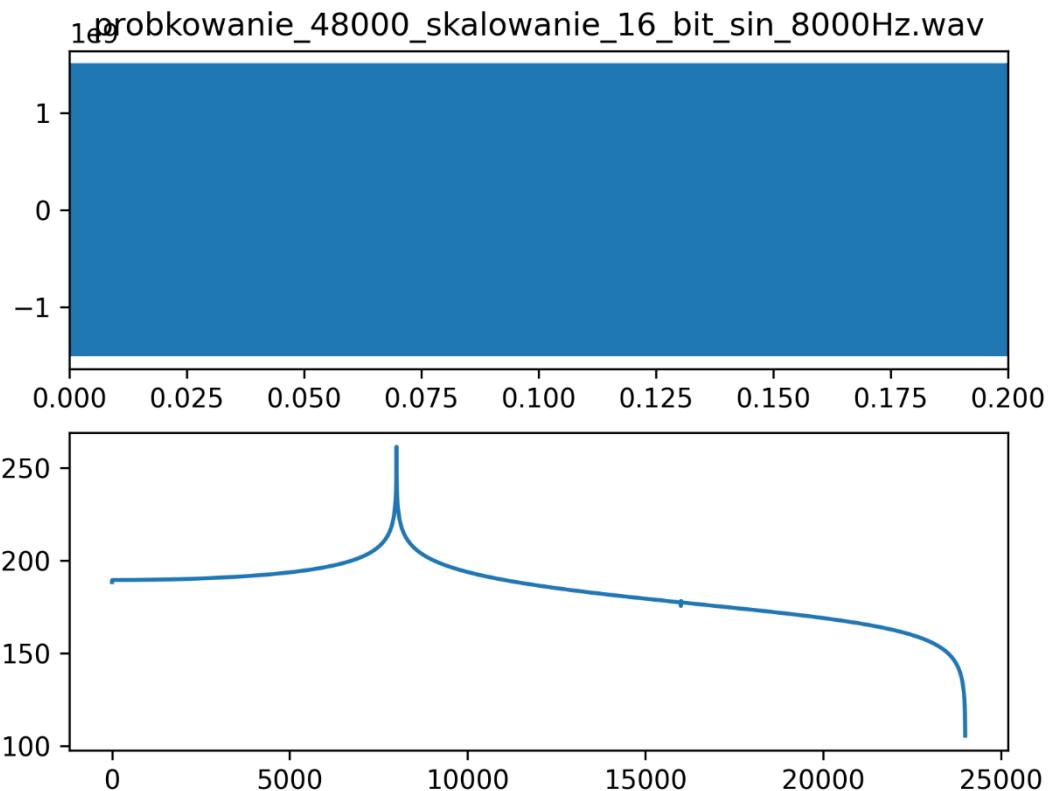
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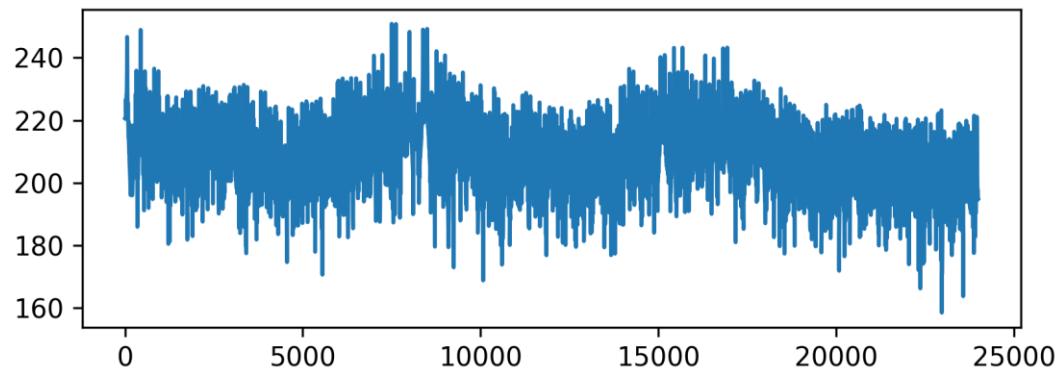
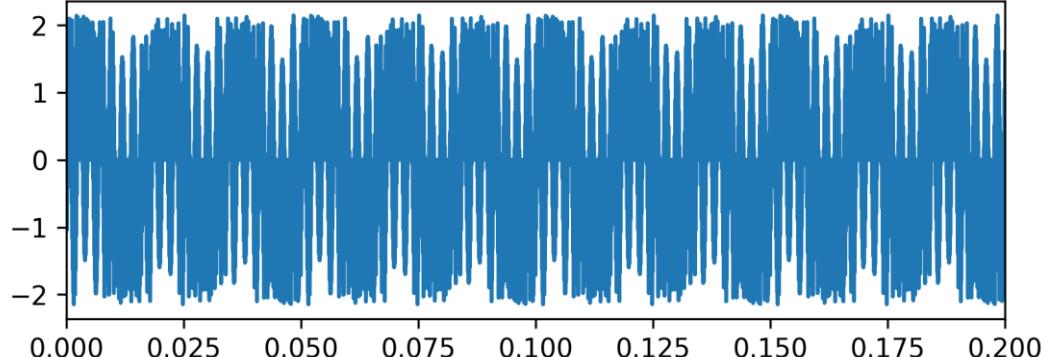
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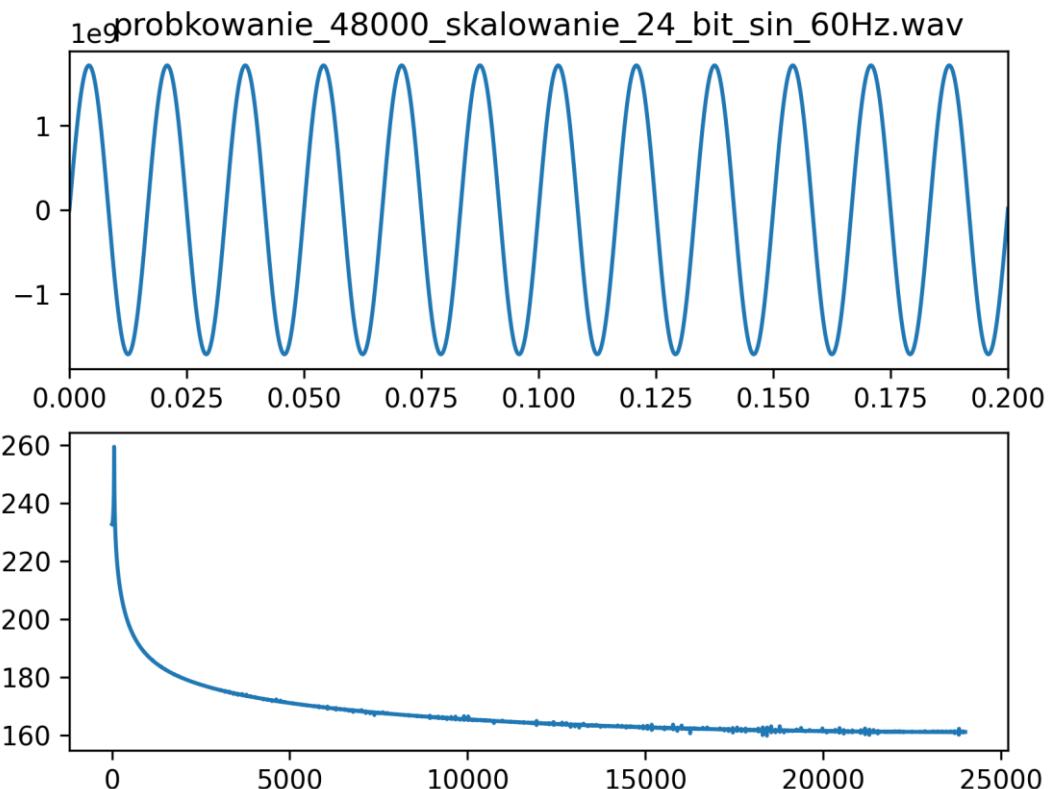
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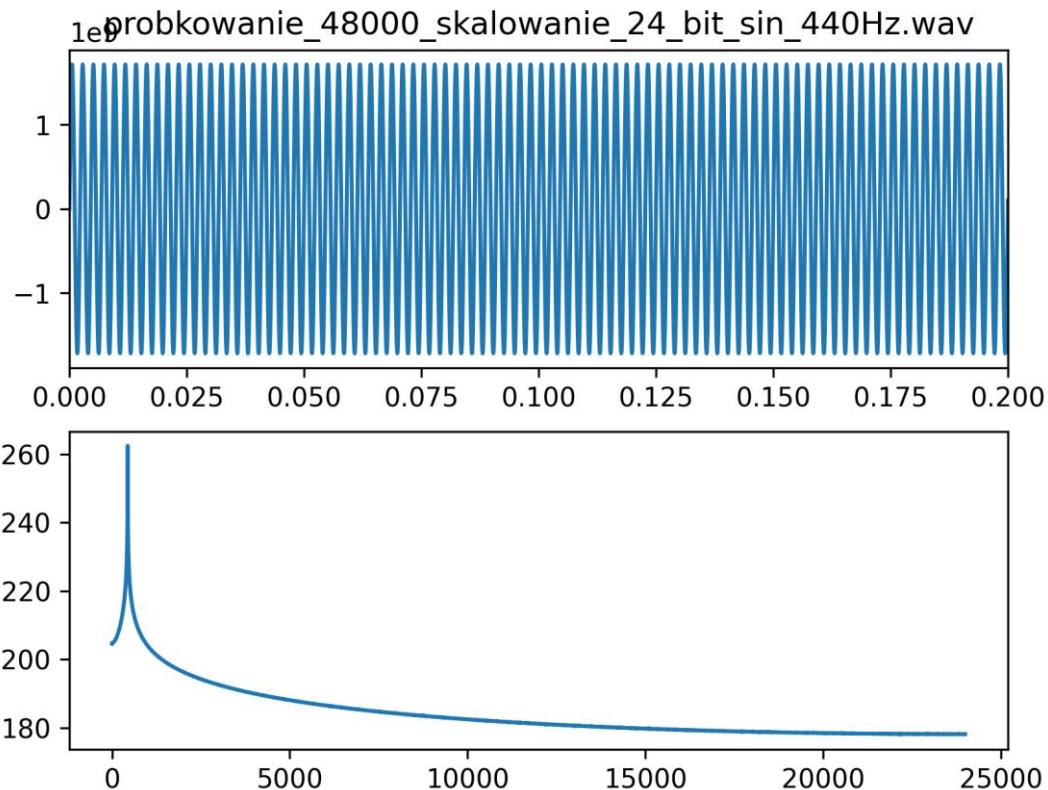
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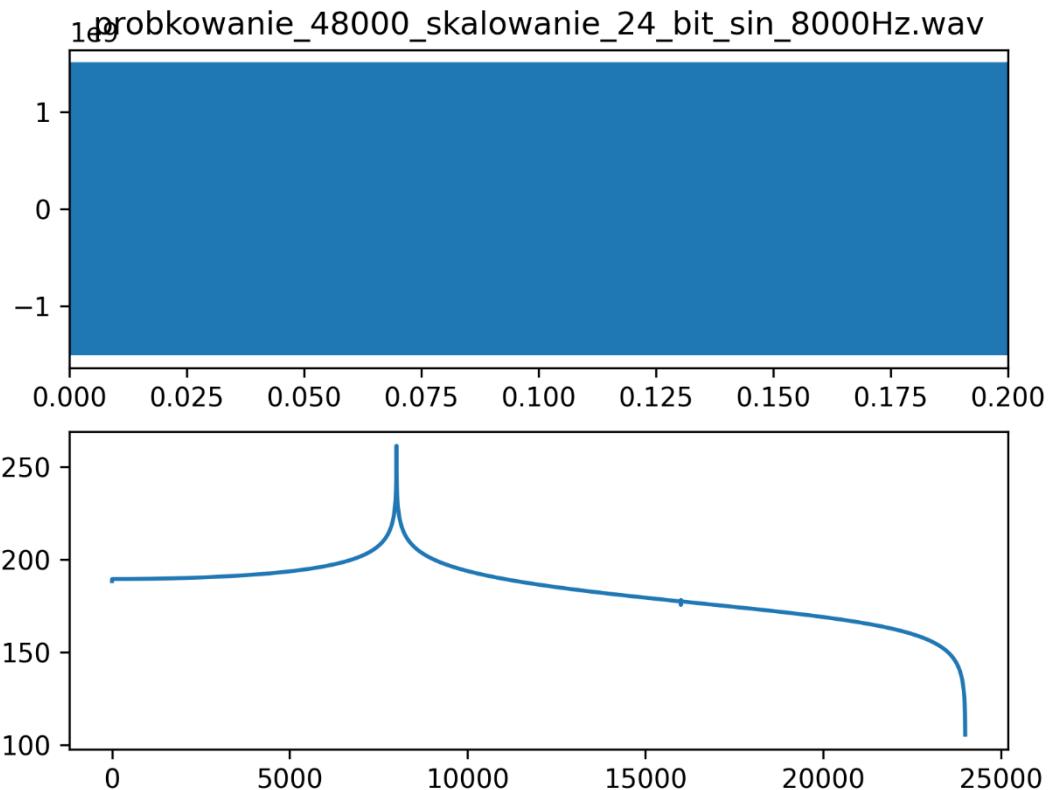
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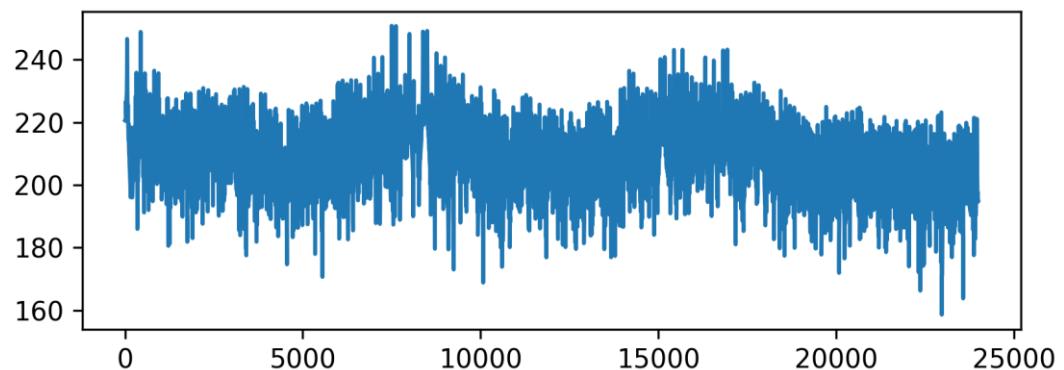
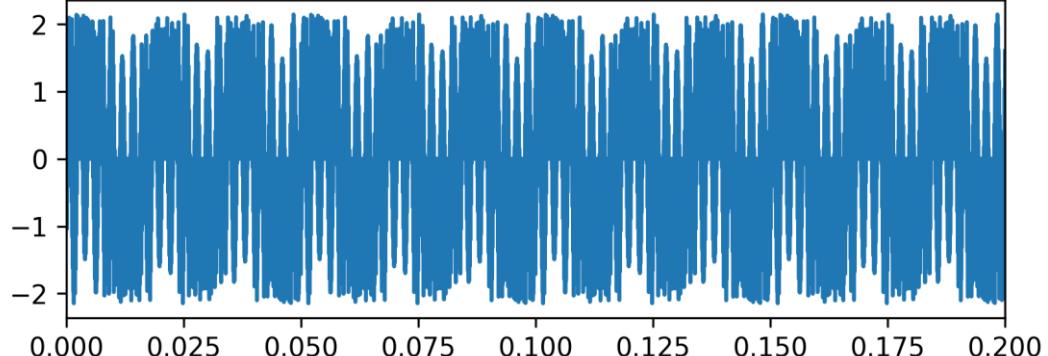
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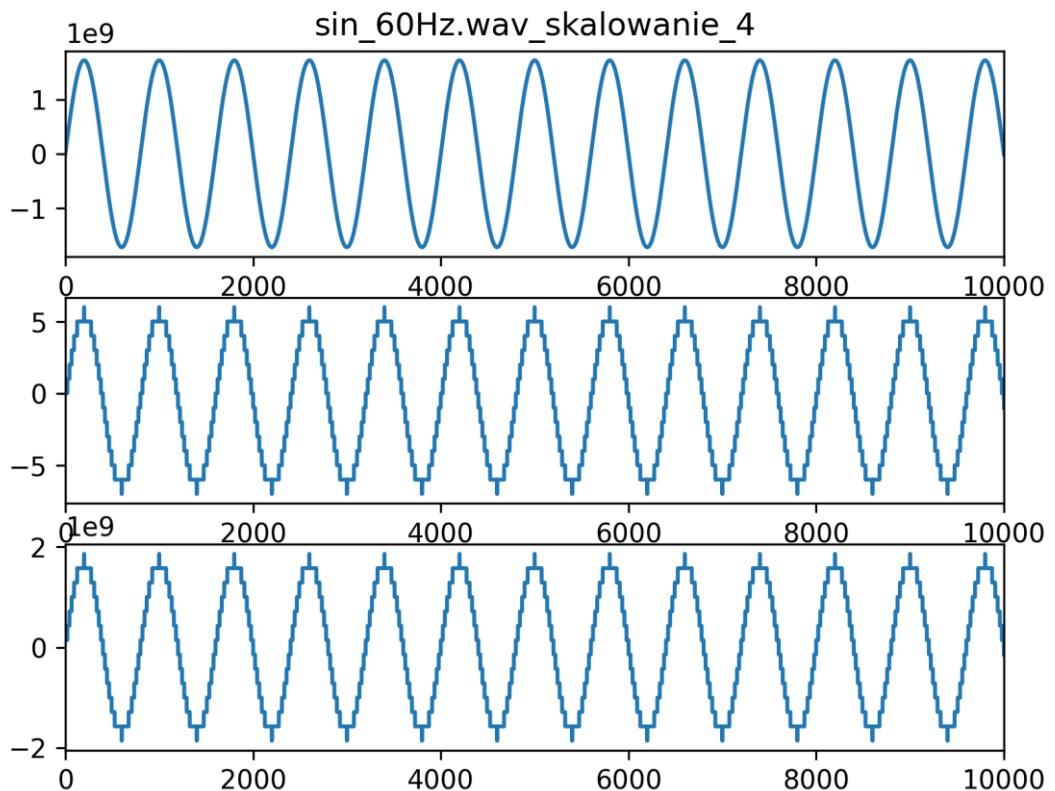


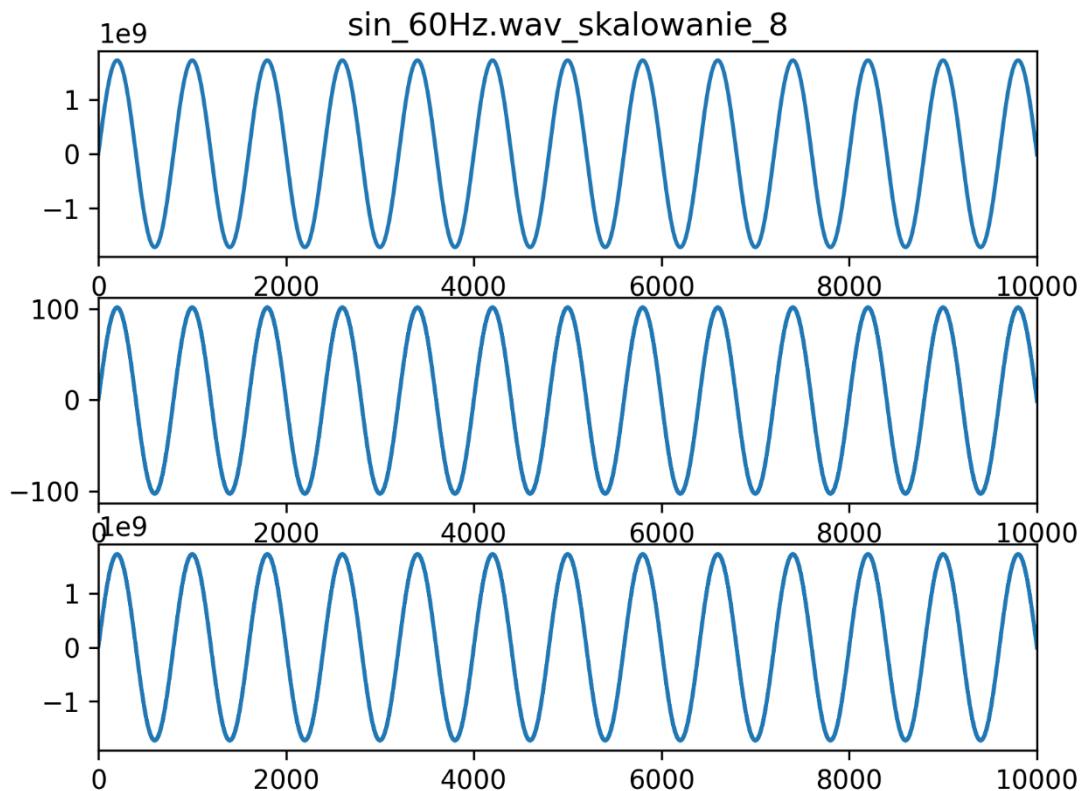
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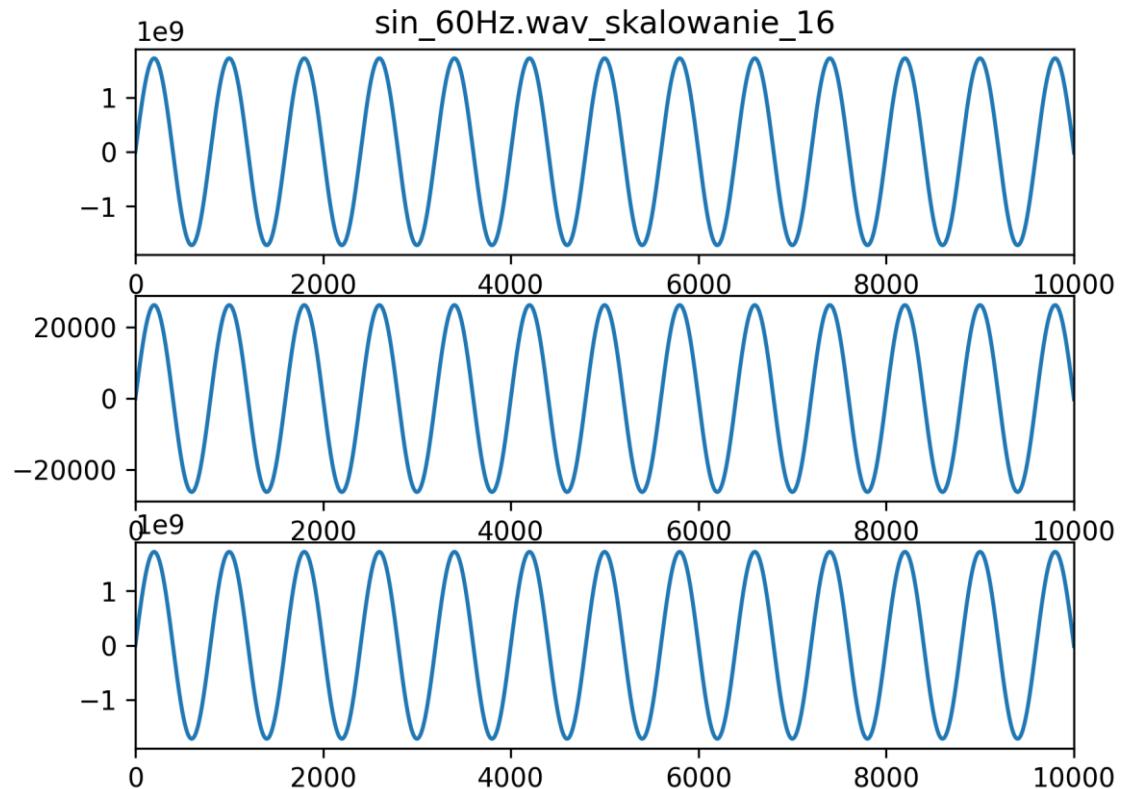
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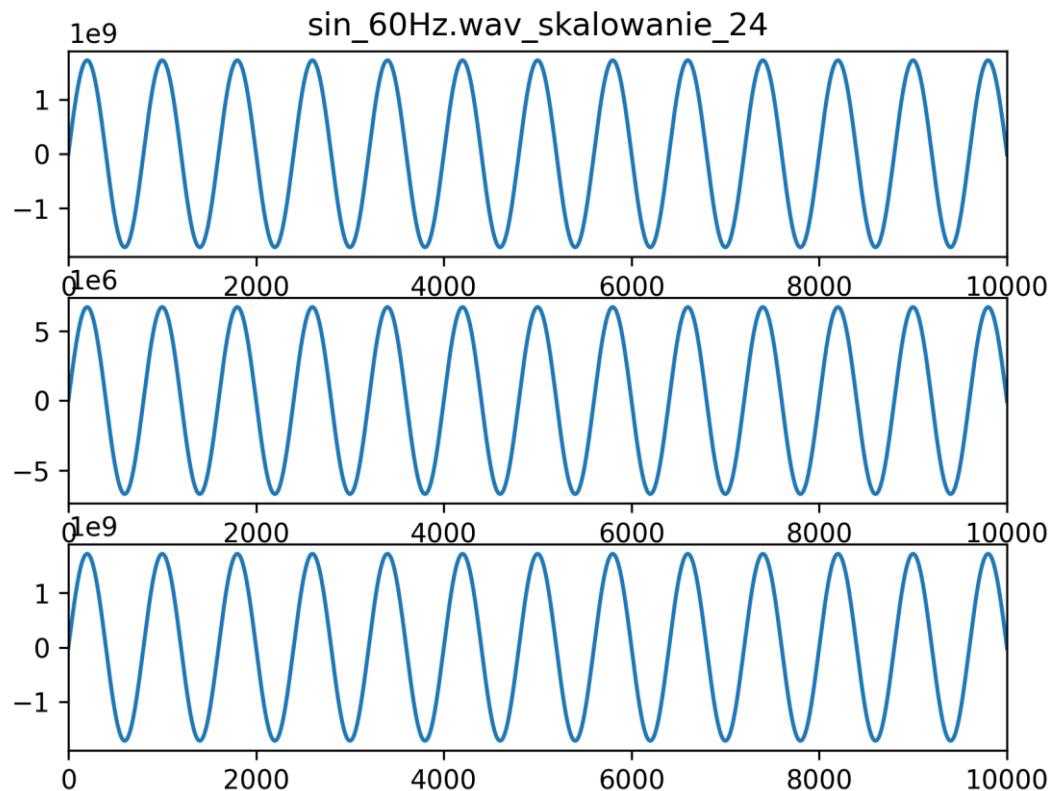
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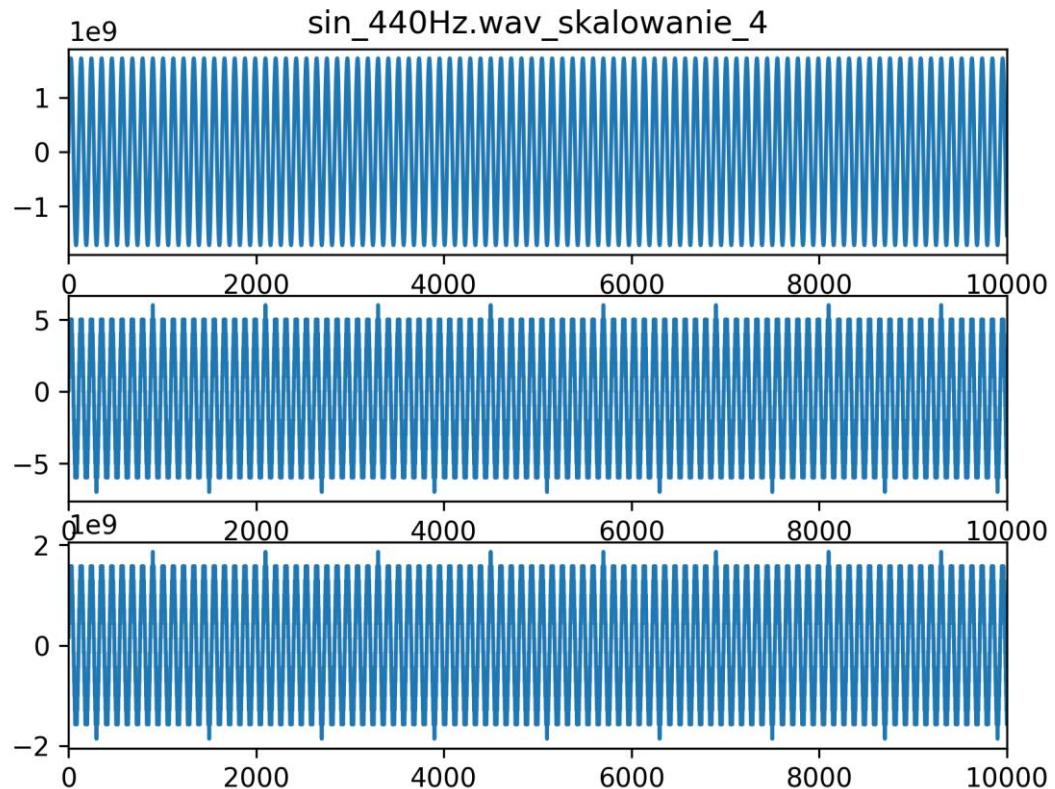






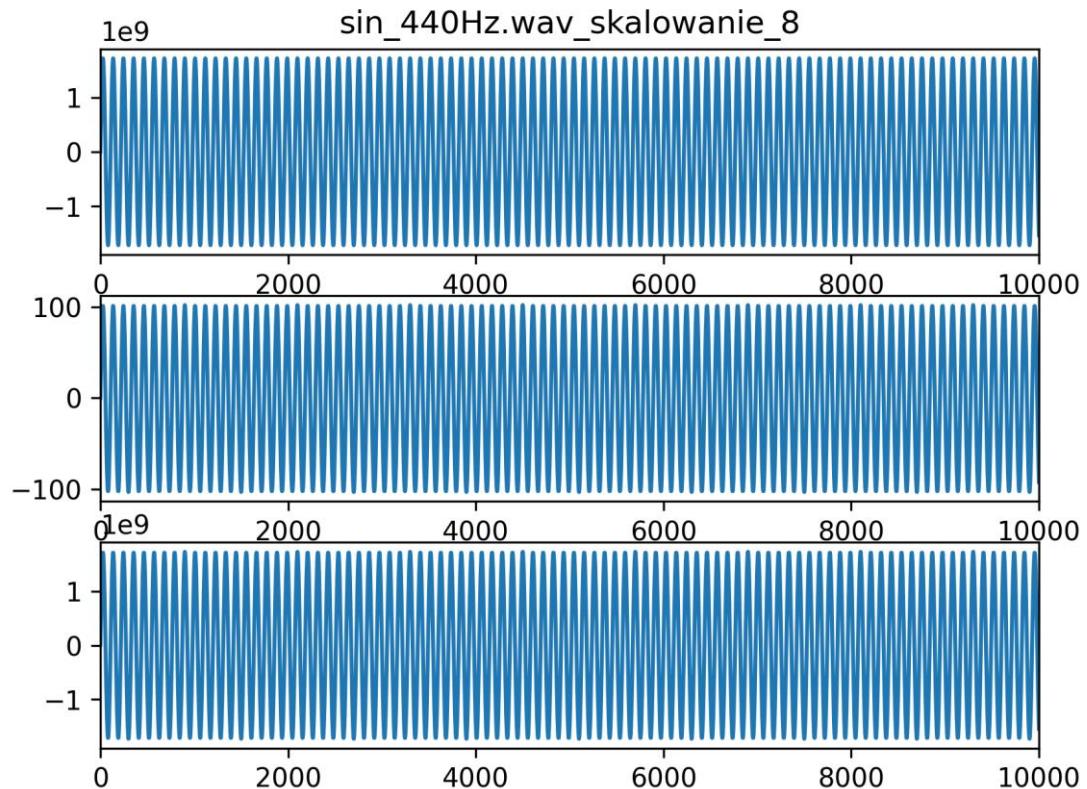
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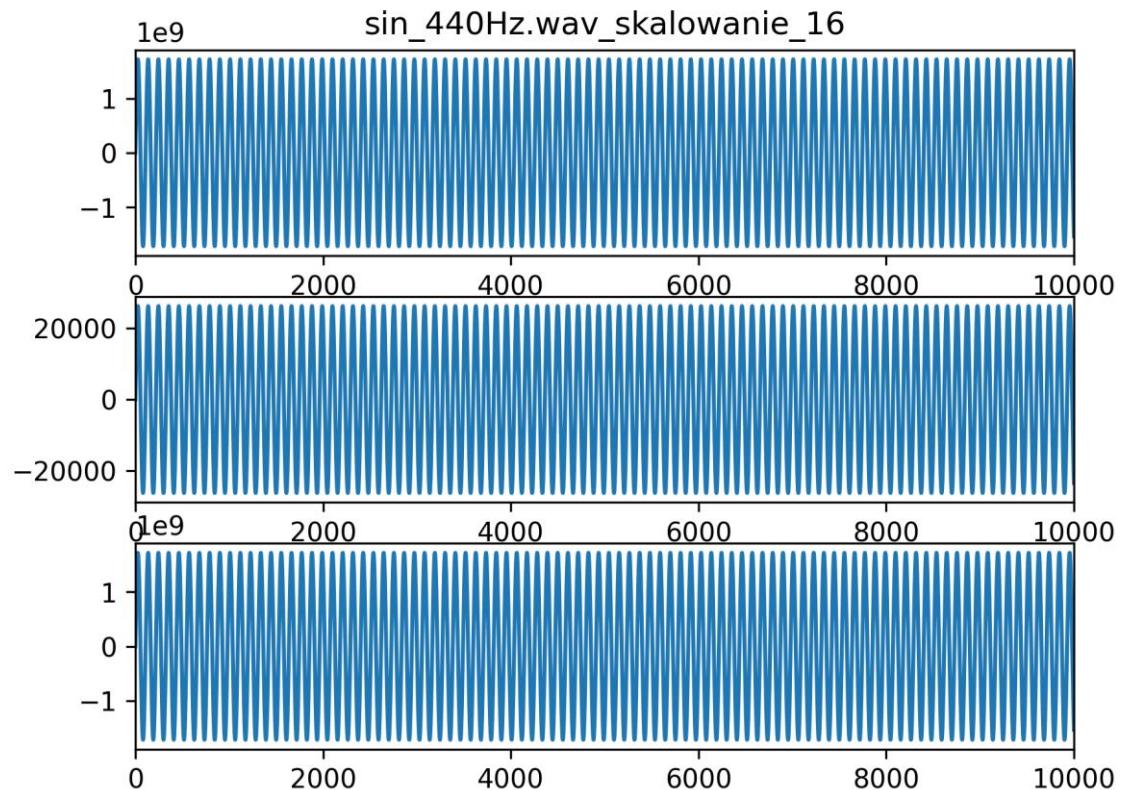
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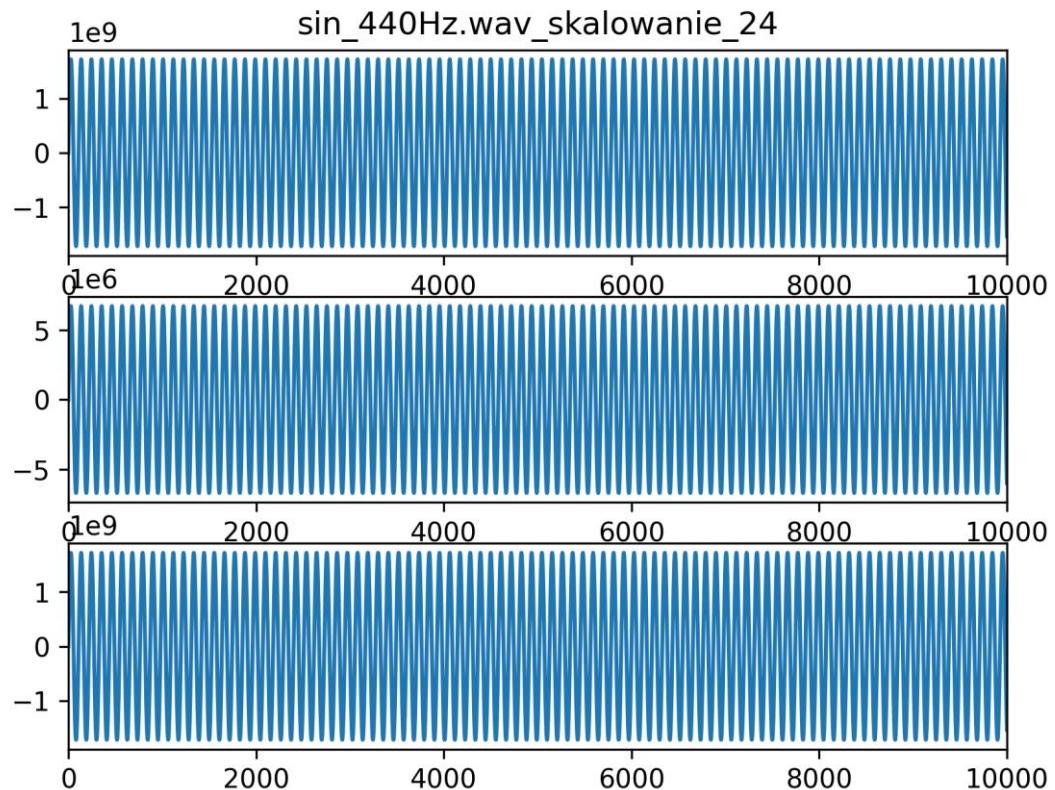
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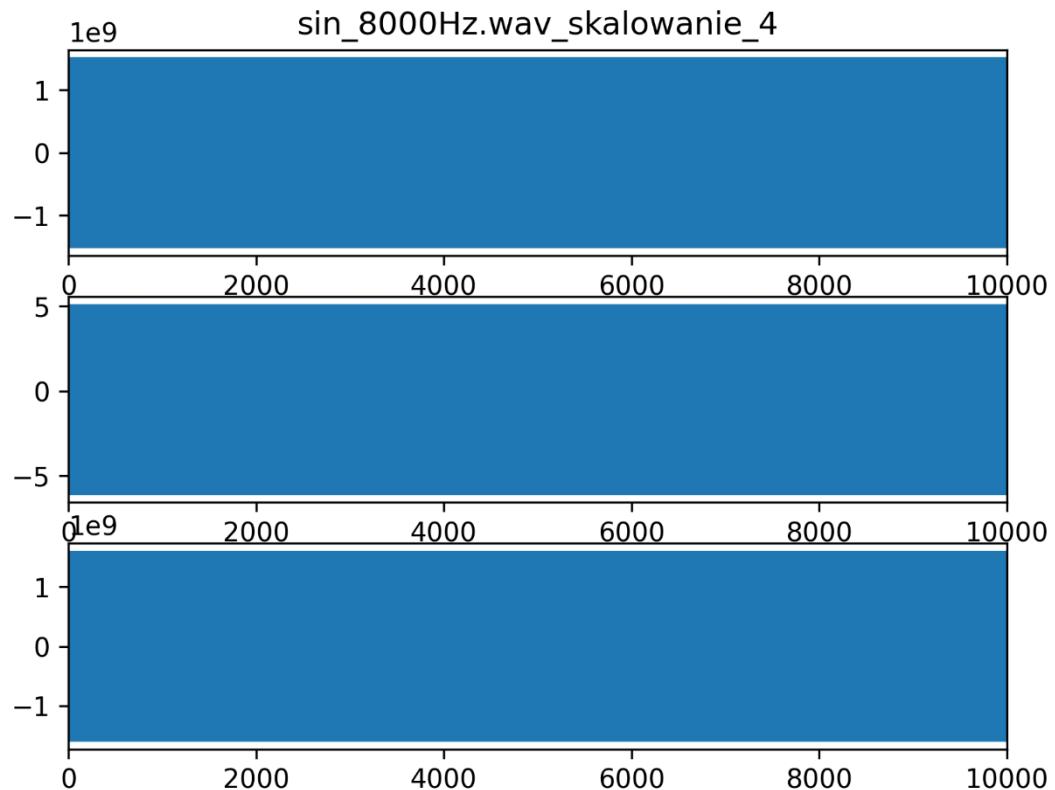
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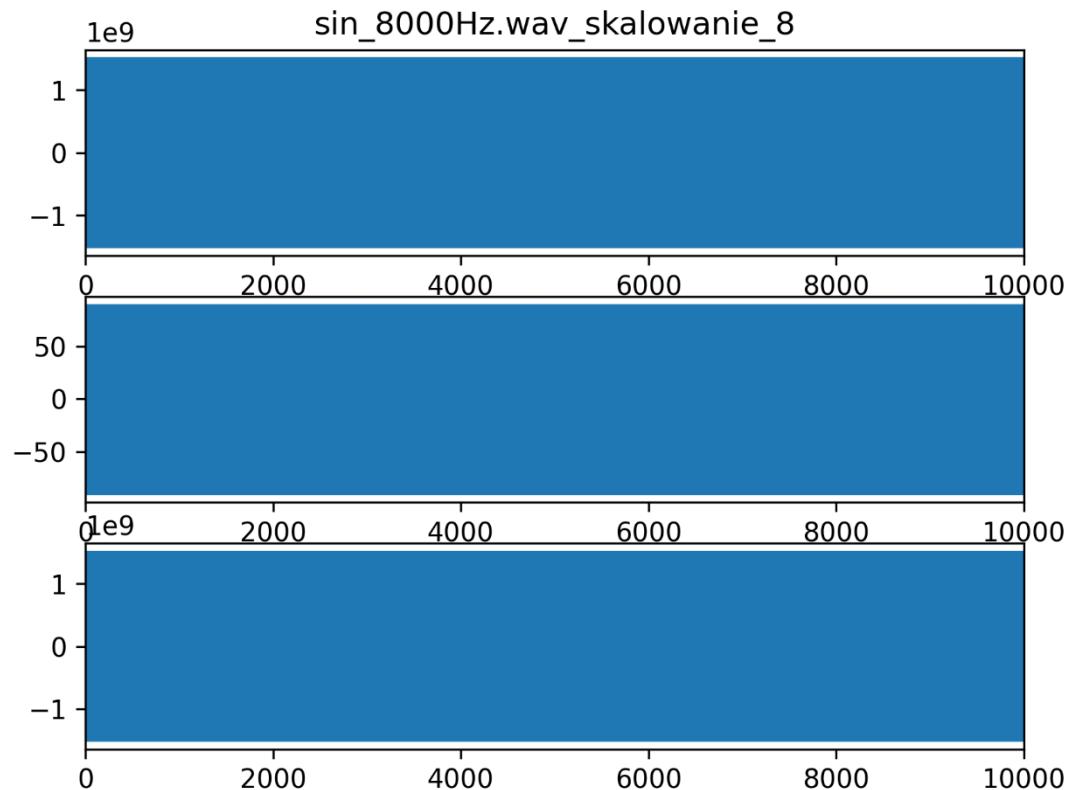
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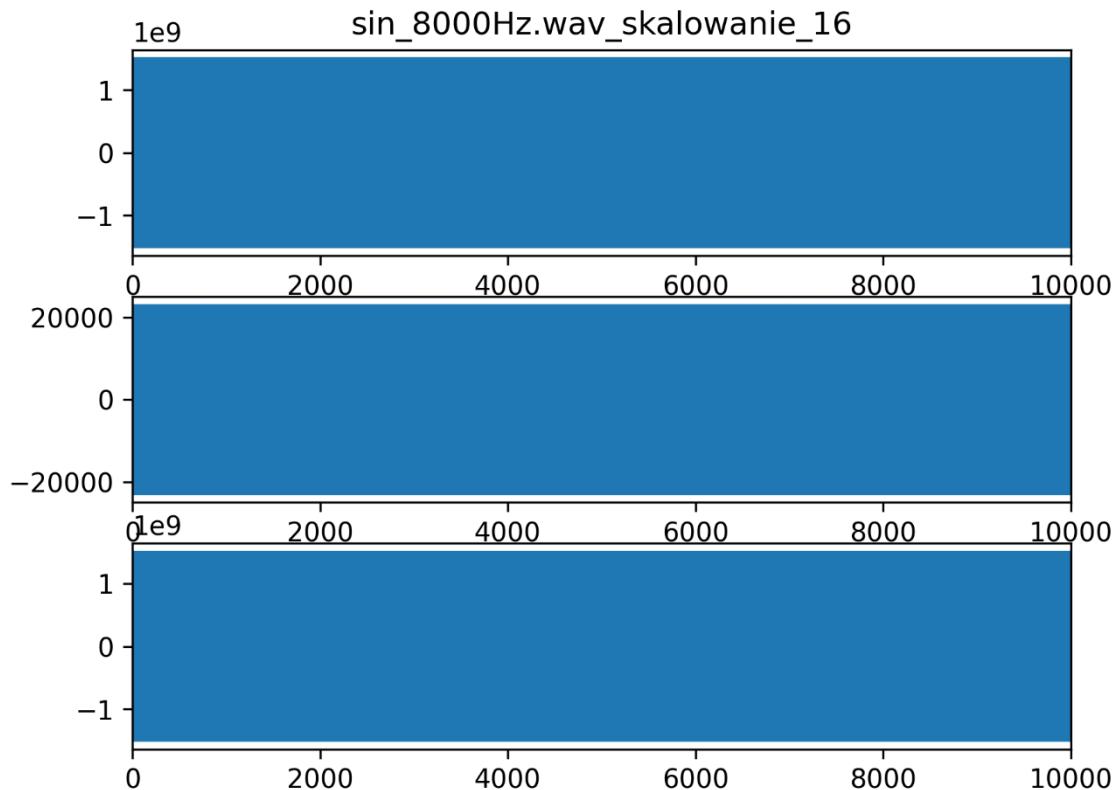
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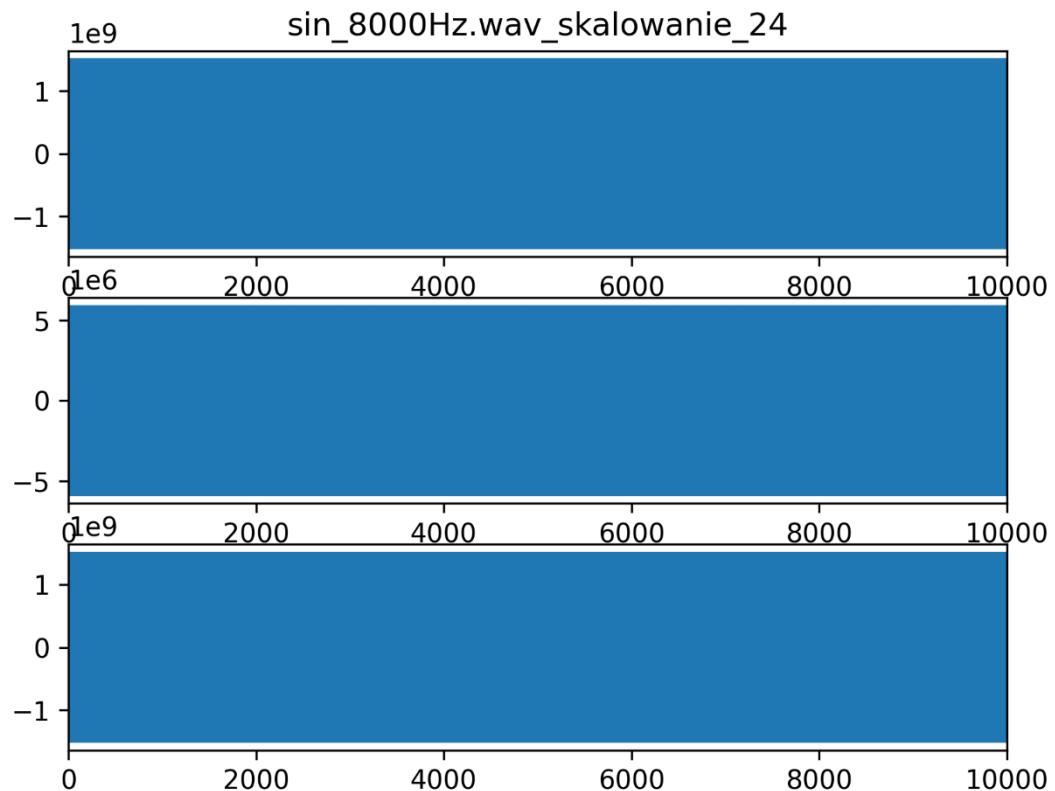
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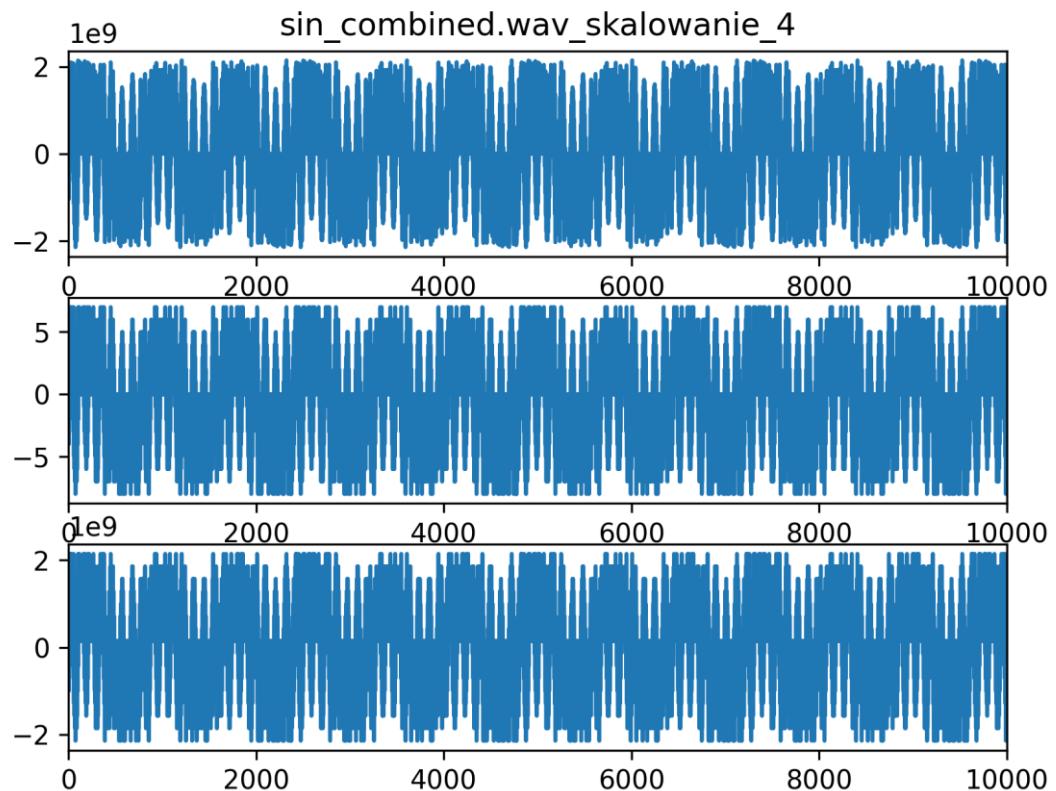
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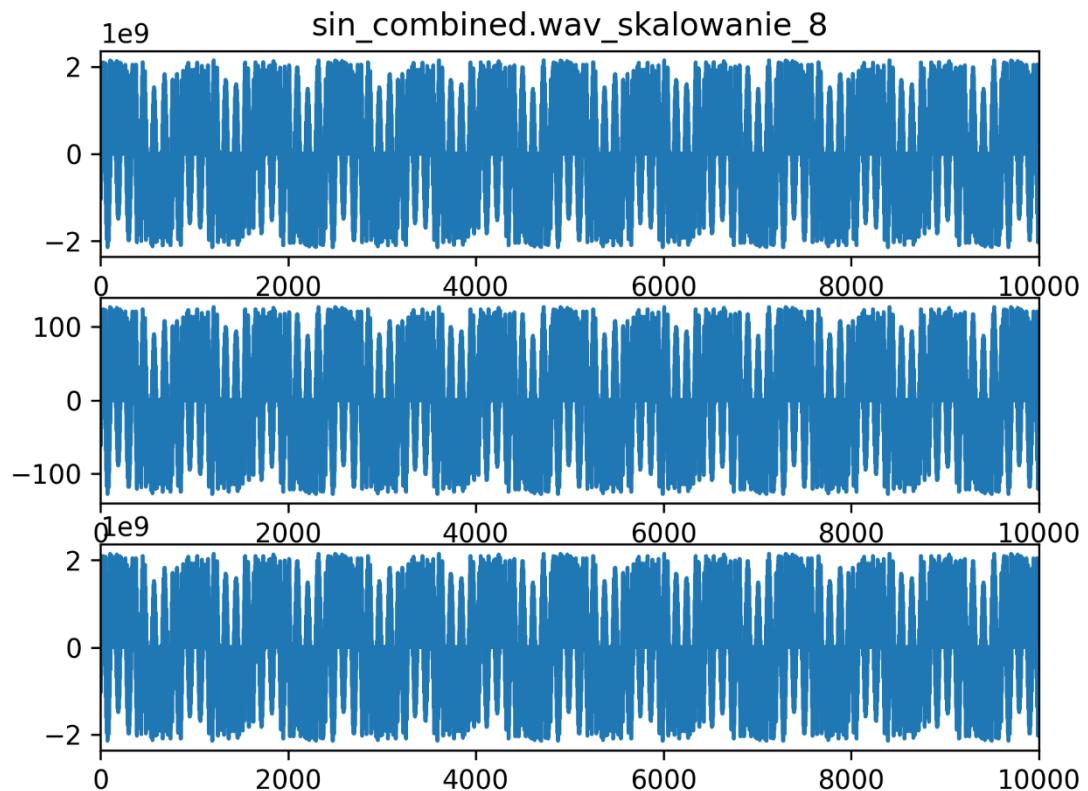
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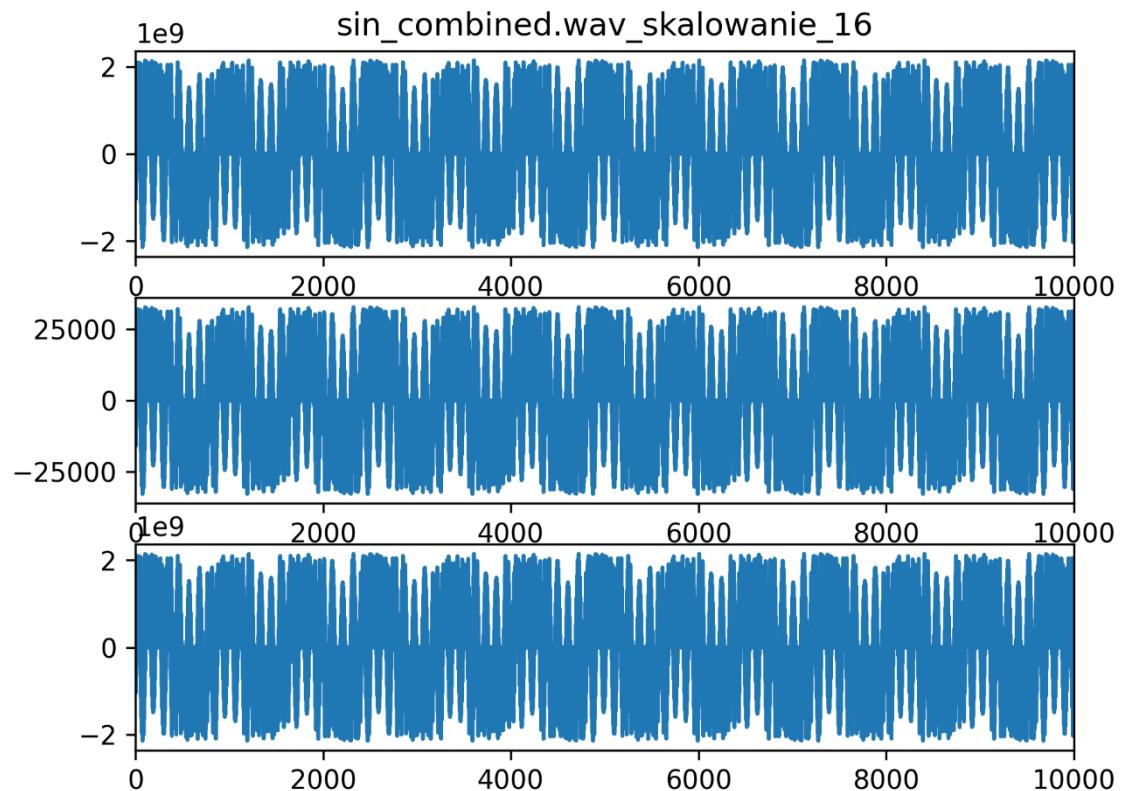
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