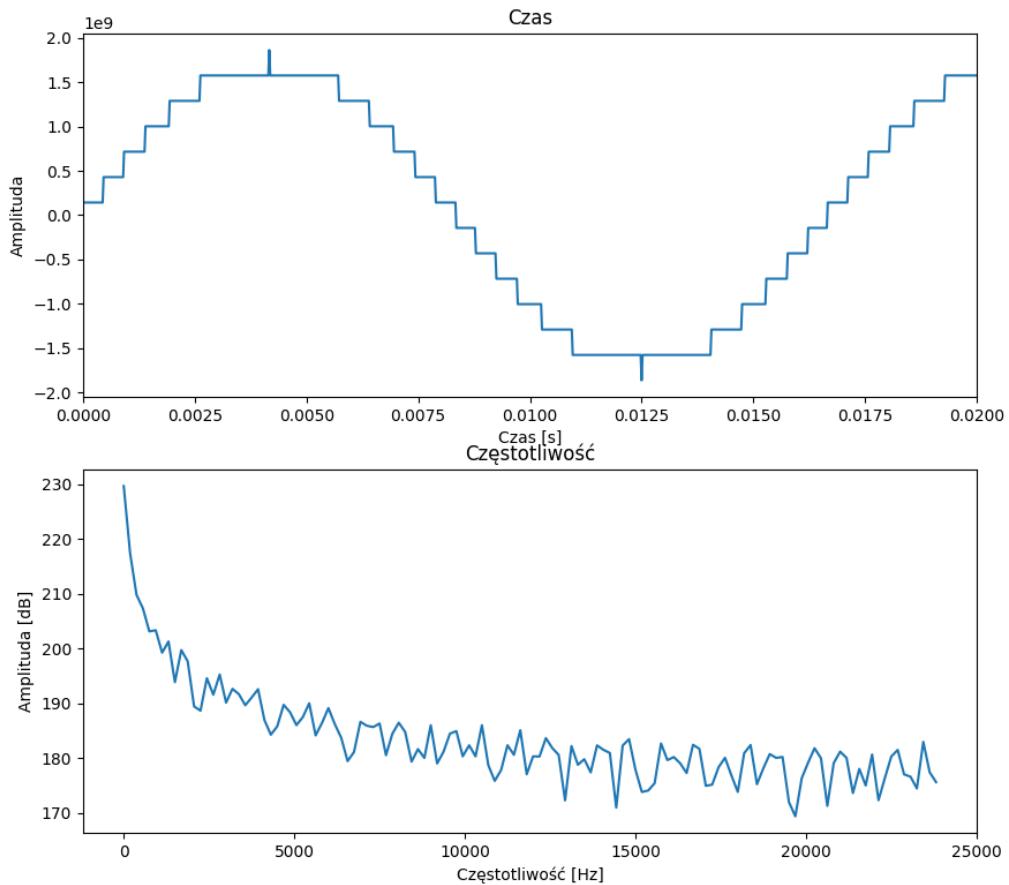


# Hubert Jakubiak LAB5

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Plik - SIN/sin\_60Hz.wav

Kwantyzacja, Bit 4



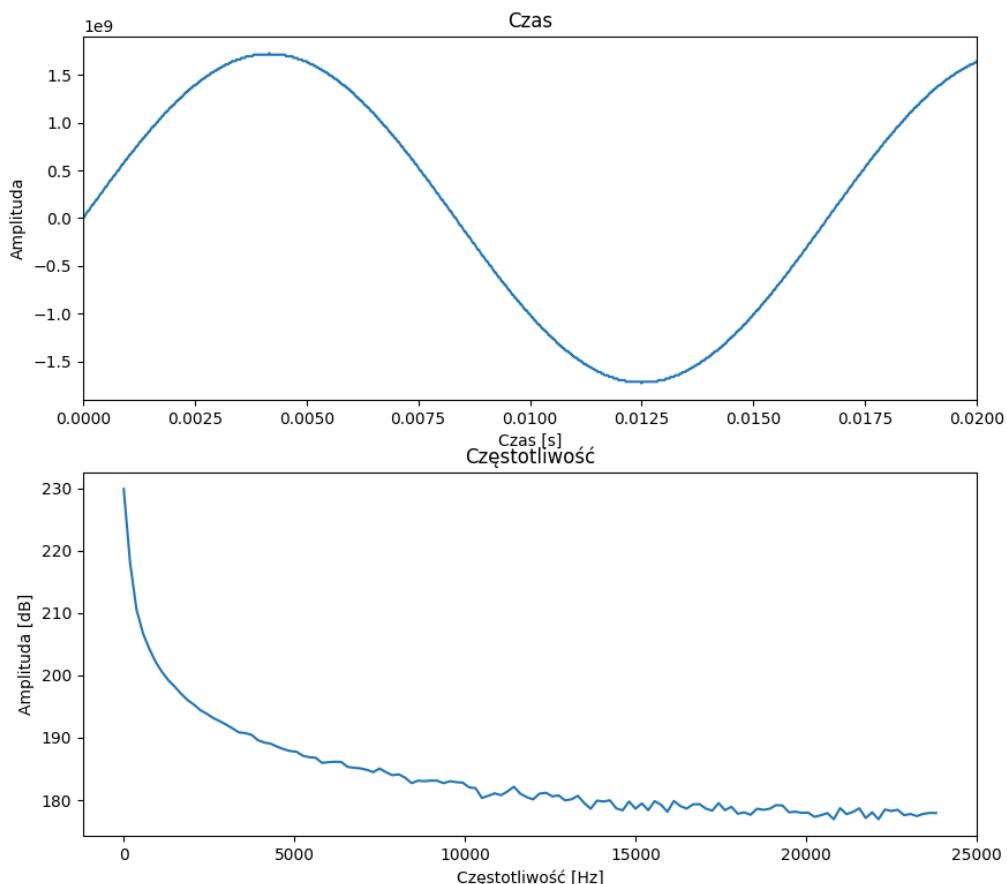
wartość losowa = [0.46252392]

Peak freq = 0.0

Peak amp = 229.61887190349628

## Plik - SIN/sin\_60Hz.wav

### Kwantyzacja, Bit 8



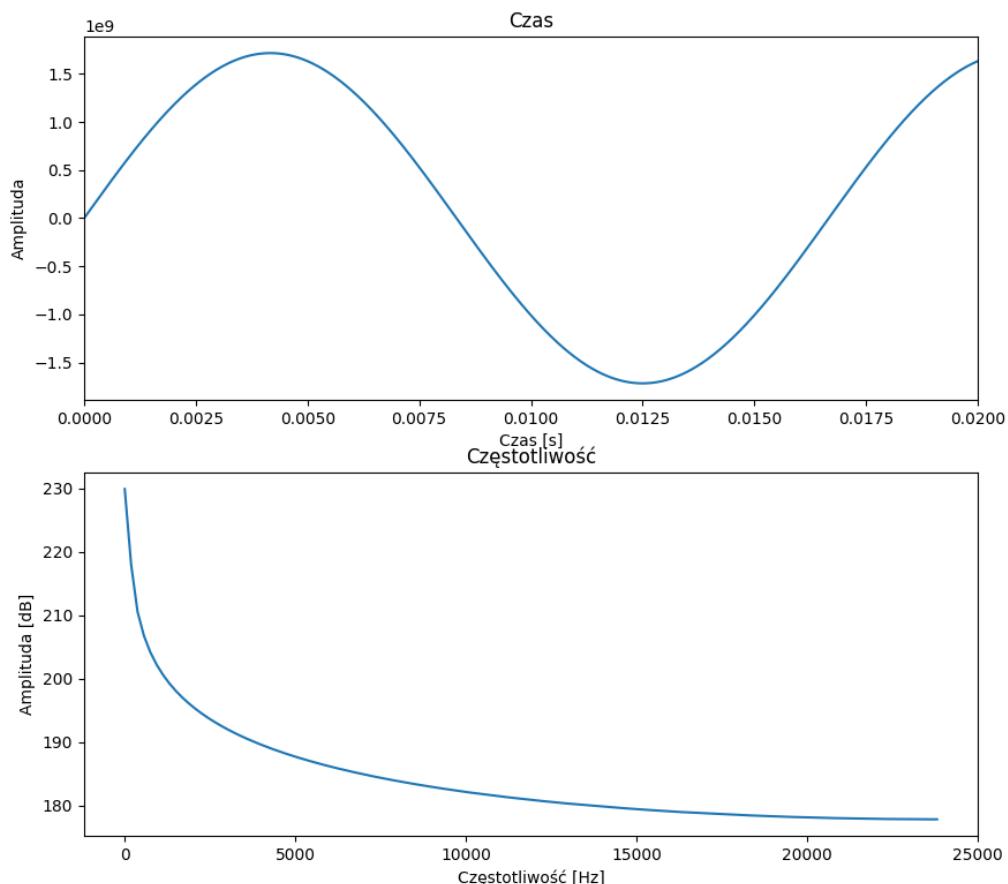
wartość losowa = [0.50770124]

Peak freq = 0.0

Peak amp = 229.85349817583324

## Plik - SIN/sin\_60Hz.wav

### Kwantyzacja, Bit 16



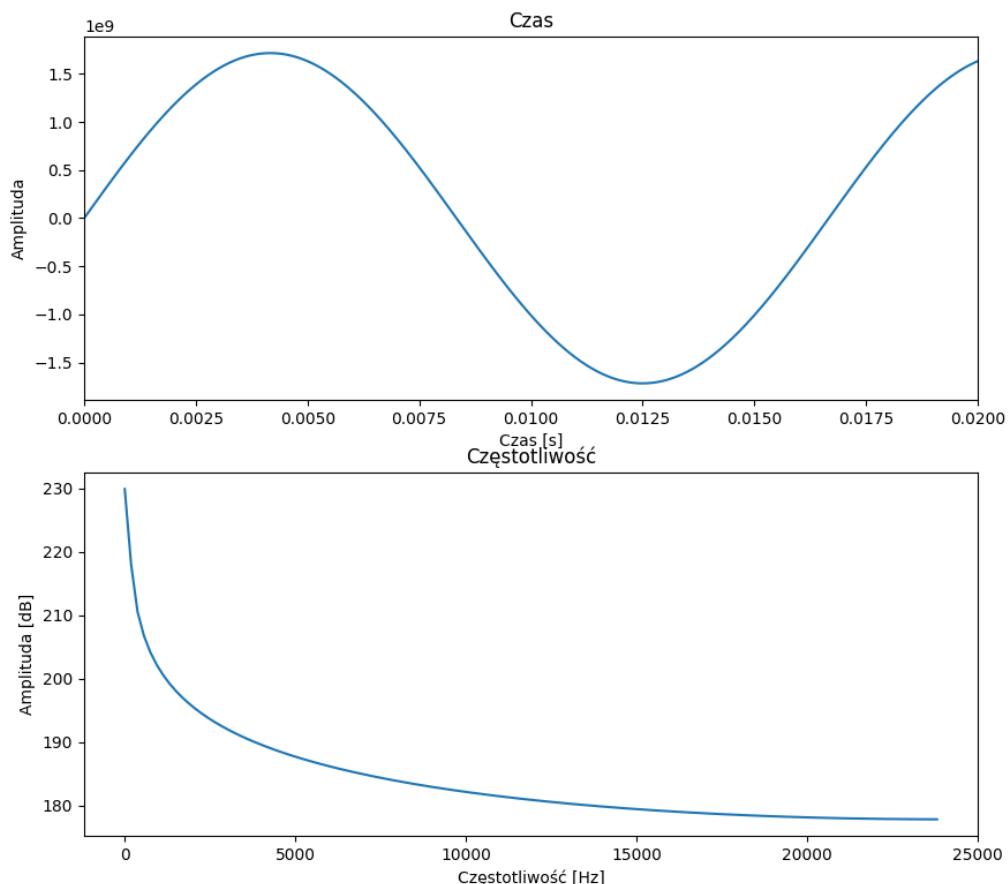
wartość losowa = [0.07261984]

Peak freq = 0.0

Peak amp = 229.85792011067034

## Plik - SIN/sin\_60Hz.wav

Kwantyzacja, Bit 24



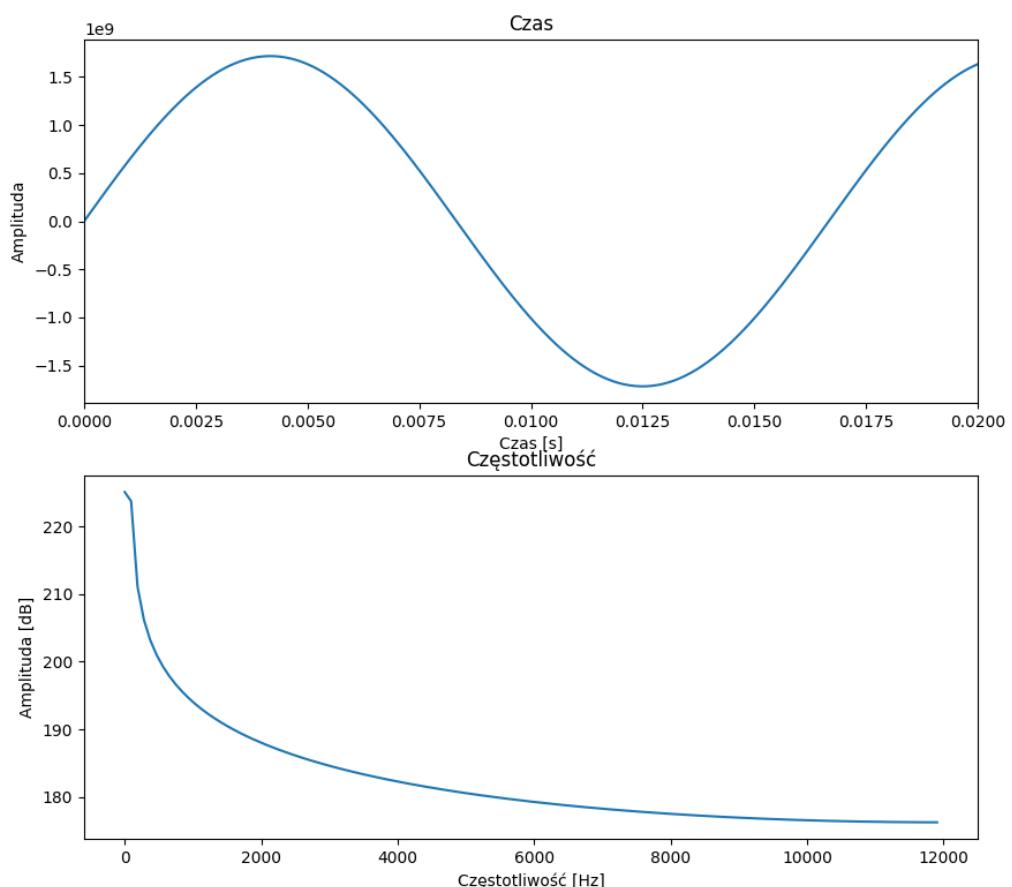
wartość losowa = [0.21064679]

Peak freq = 0.0

Peak amp = 229.85792748073078

## Plik - SIN/sin\_60Hz.wav

### Decymacja, N 2



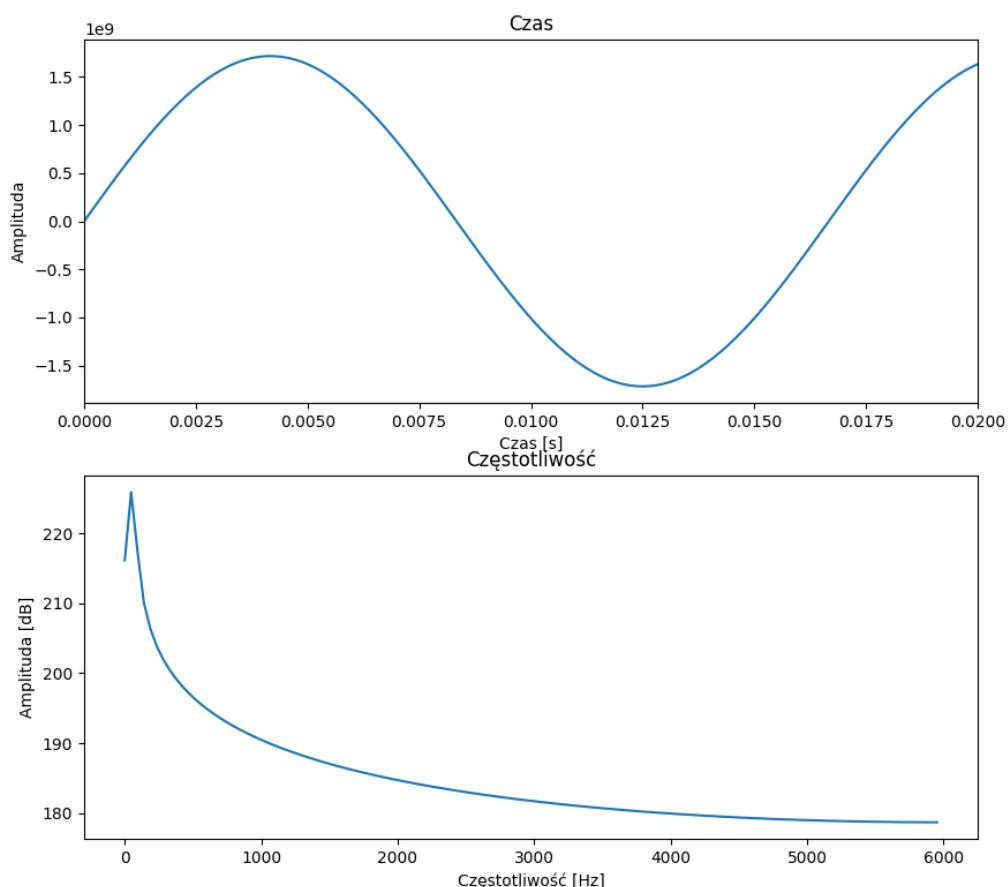
wartość losowa = [0.27057825]

Peak freq = 0.0

Peak amp = 225.09308687027868

## Plik - SIN/sin\_60Hz.wav

Decymacja, N 4



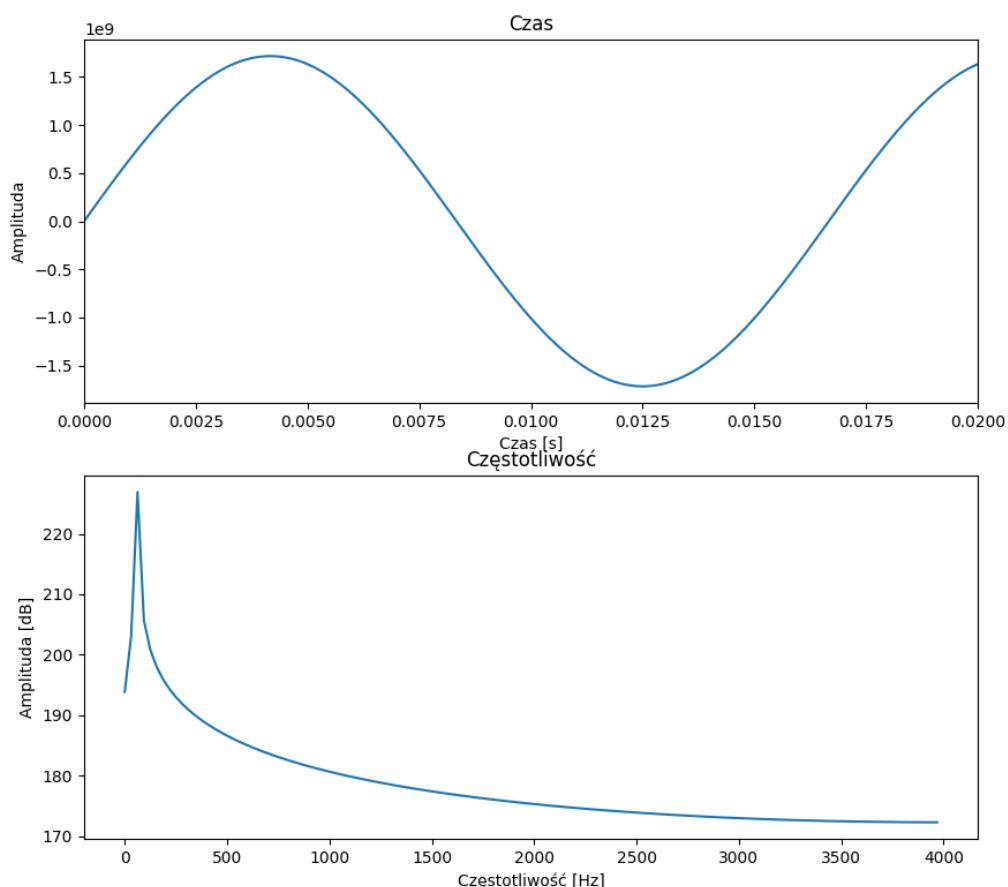
wartość losowa = [0.45815233]

Peak freq = 46.875

Peak amp = 225.9204562229551

## Plik - SIN/sin\_60Hz.wav

Decymacja, N 6



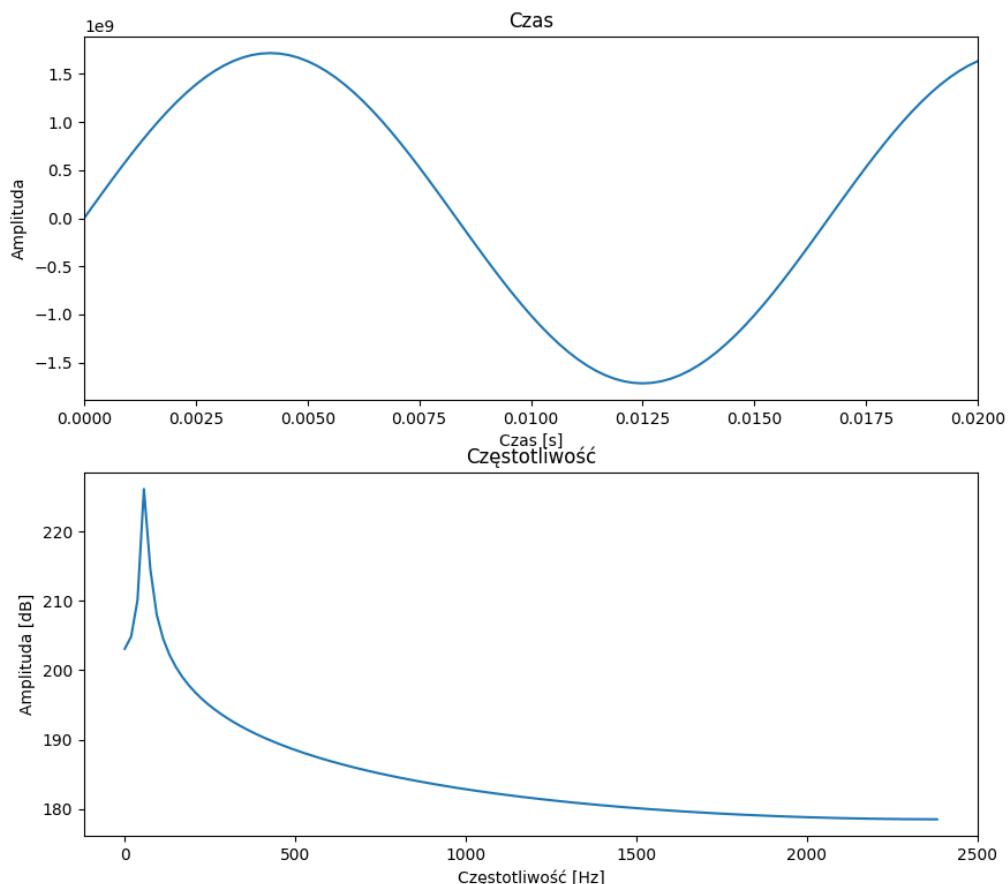
wartość losowa = [0.80366008]

Peak freq = 62.5

Peak amp = 226.90333966076088

## Plik - SIN/sin\_60Hz.wav

Decymacja, N 10



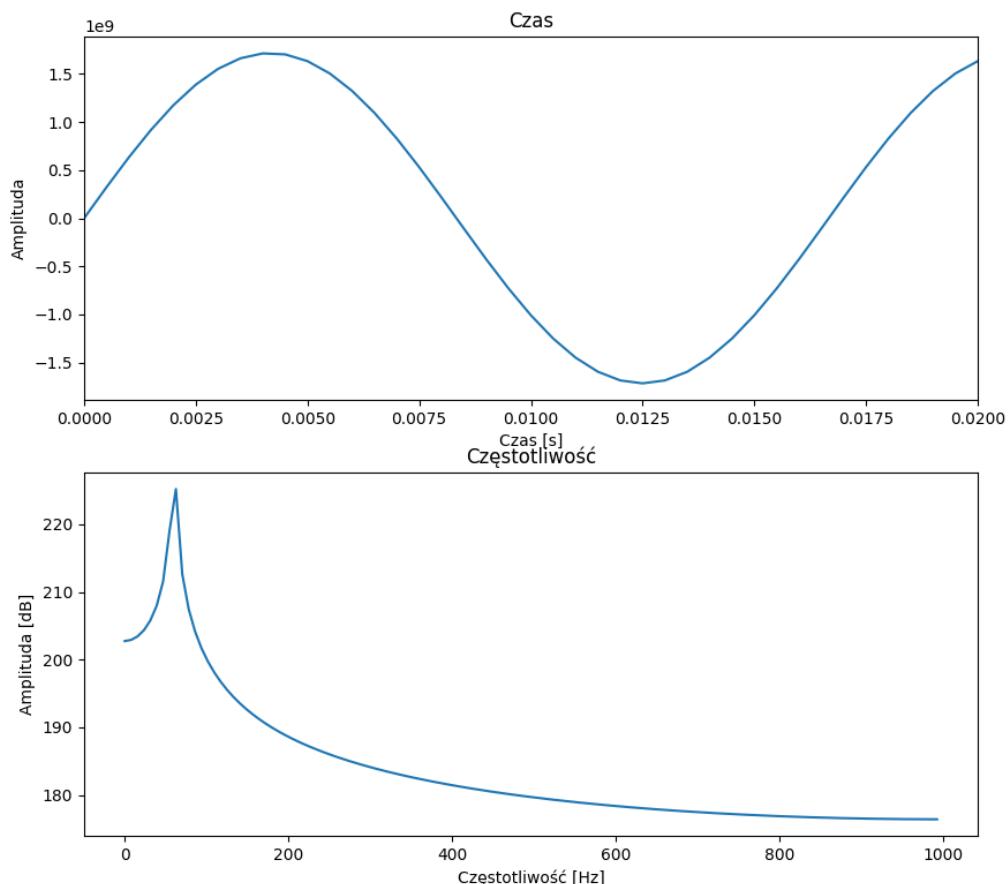
wartość losowa = [0.30581793]

Peak freq = 56.25

Peak amp = 226.16134585330354

## Plik - SIN/sin\_60Hz.wav

Decymacja, N 24



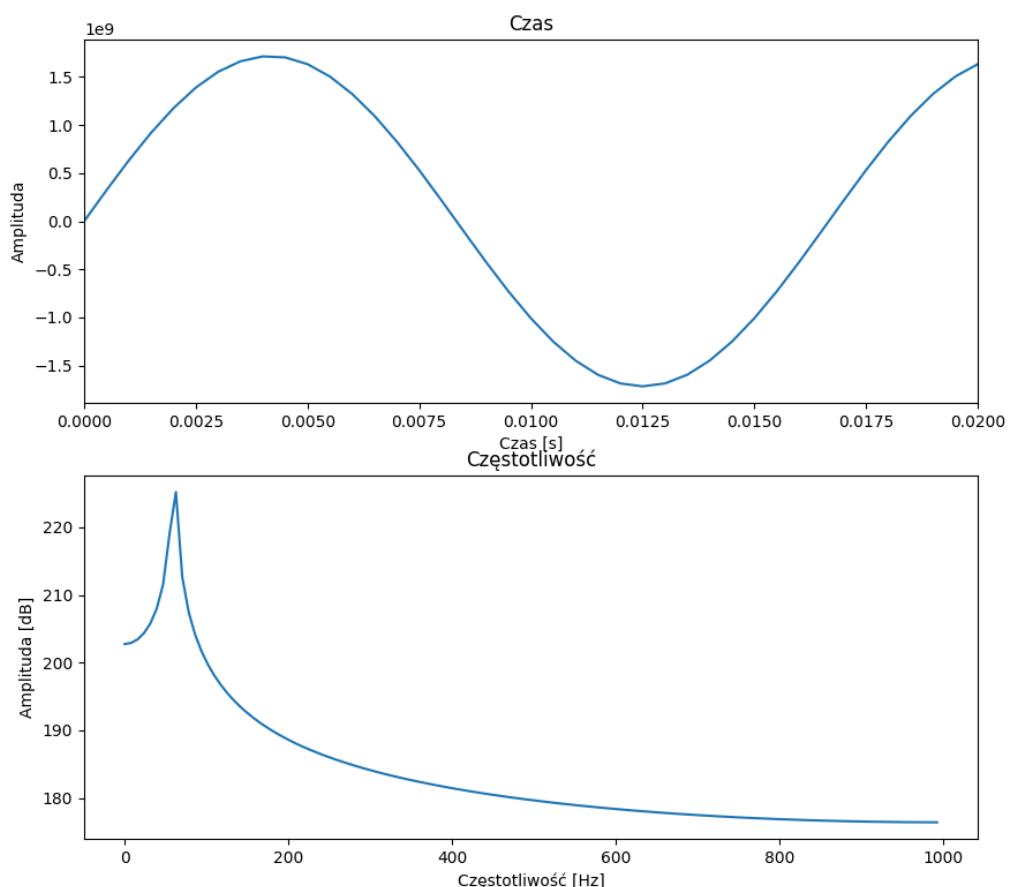
wartość losowa = [0.2947489]

Peak freq = 62.5

Peak amp = 225.2245968588228

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 2000



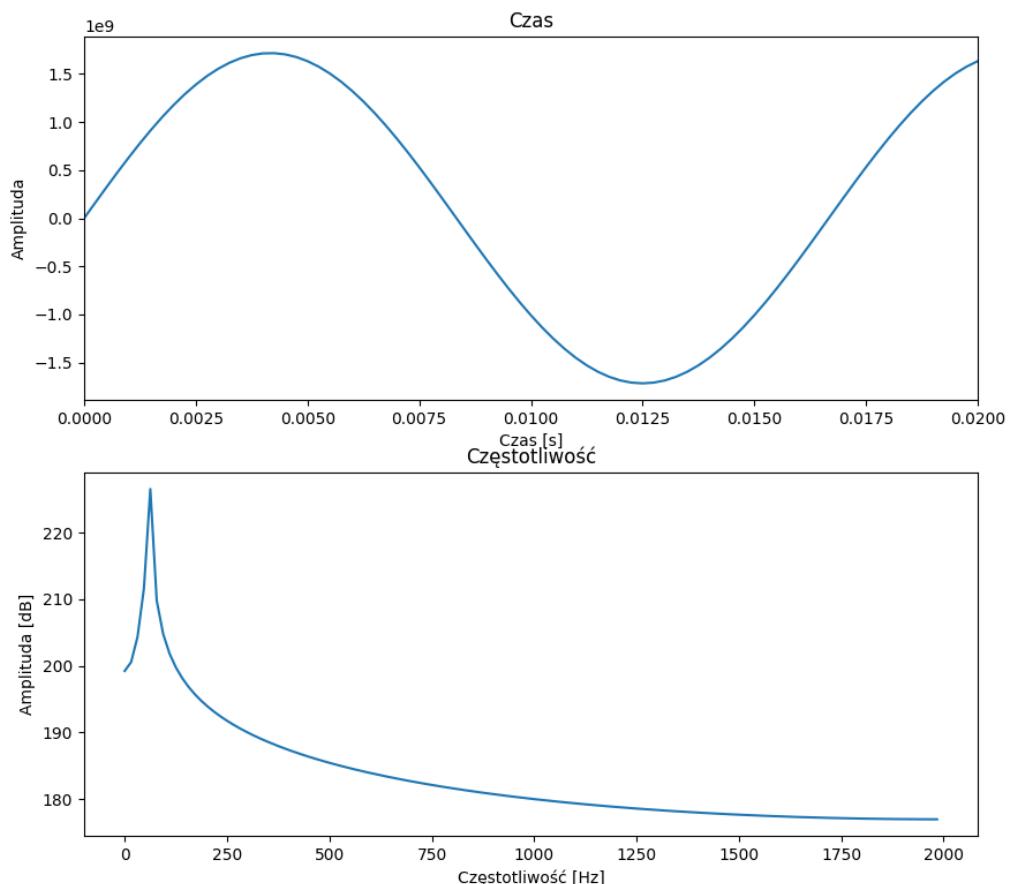
wartość losowa = [0.3261192]

Peak freq = 62.5

Peak amp = 225.2245968588228

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 4000



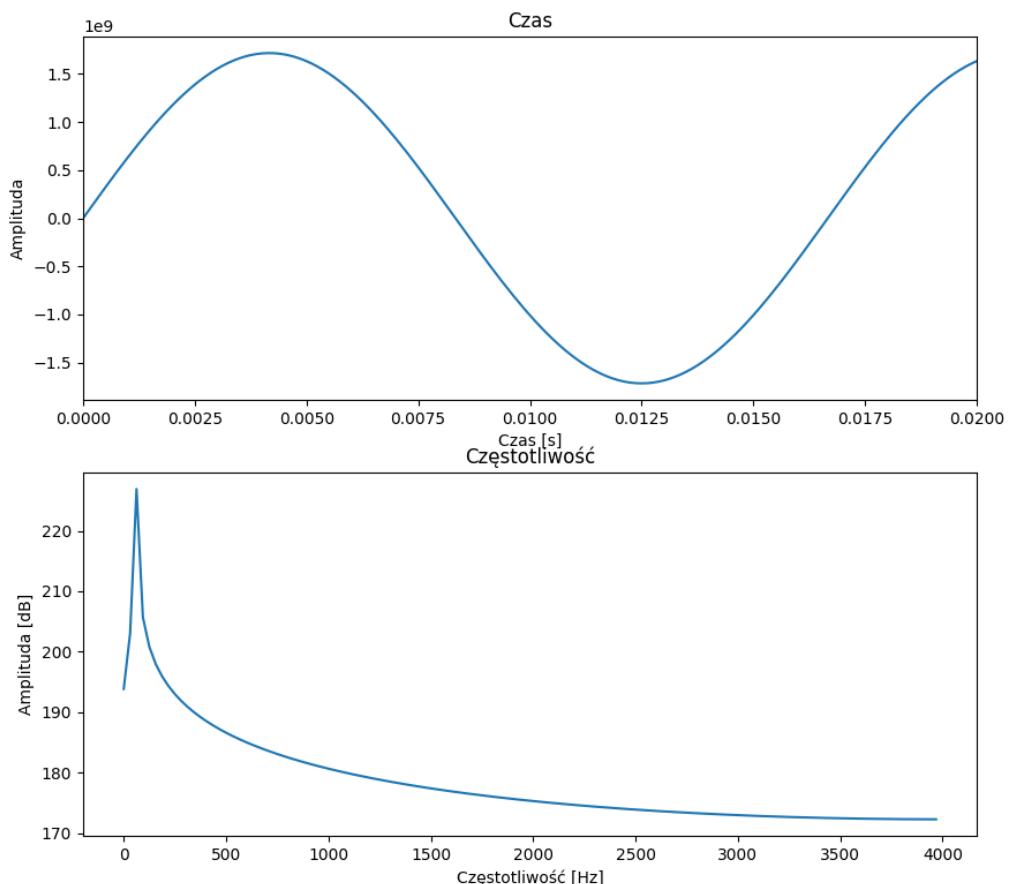
wartość losowa = [0.19689206]

Peak freq = 62.5

Peak amp = 226.55734791390415

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 8000



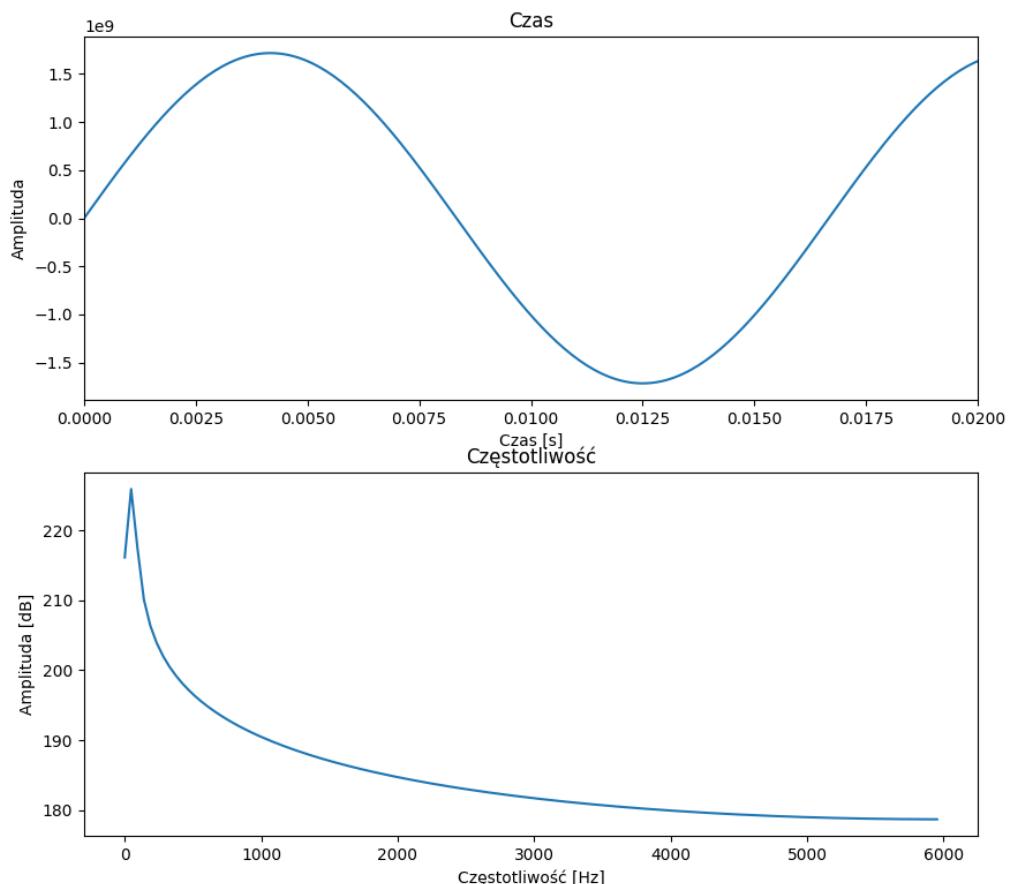
wartość losowa = [0.83942206]

Peak freq = 62.5

Peak amp = 226.90333966076088

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 11999



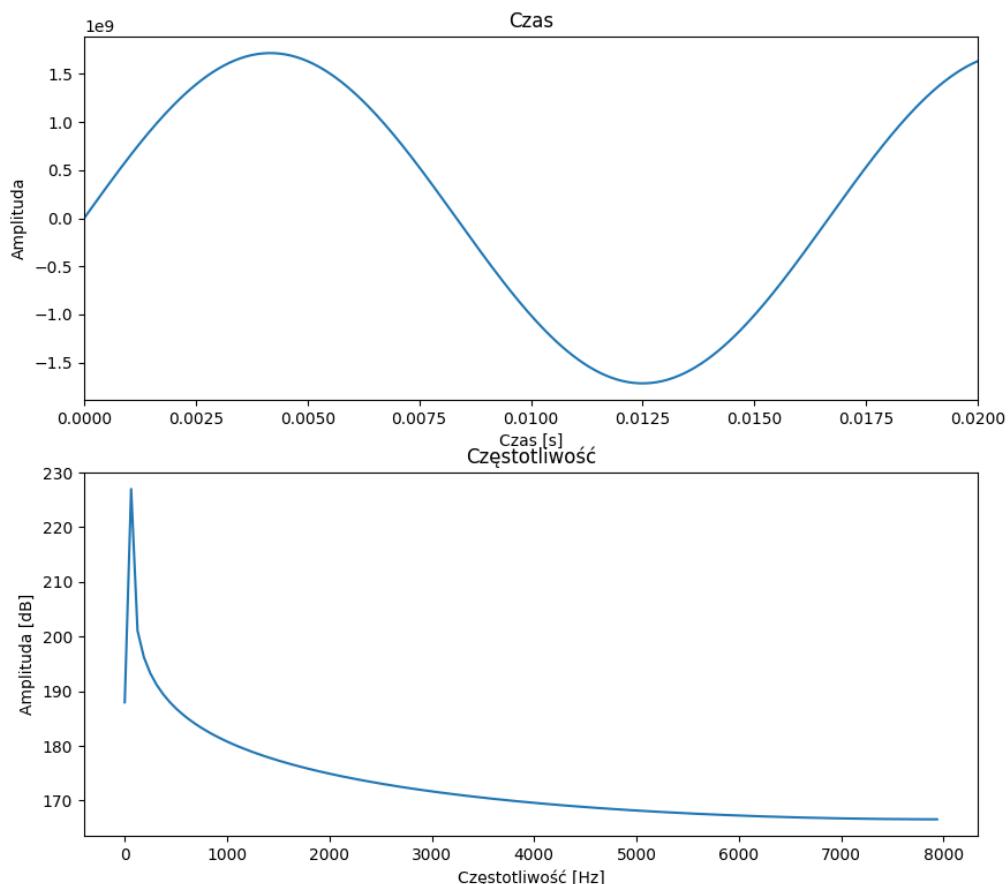
wartość losowa = [0.32619192]

Peak freq = 46.87109375

Peak amp = 225.92030707533274

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 16000



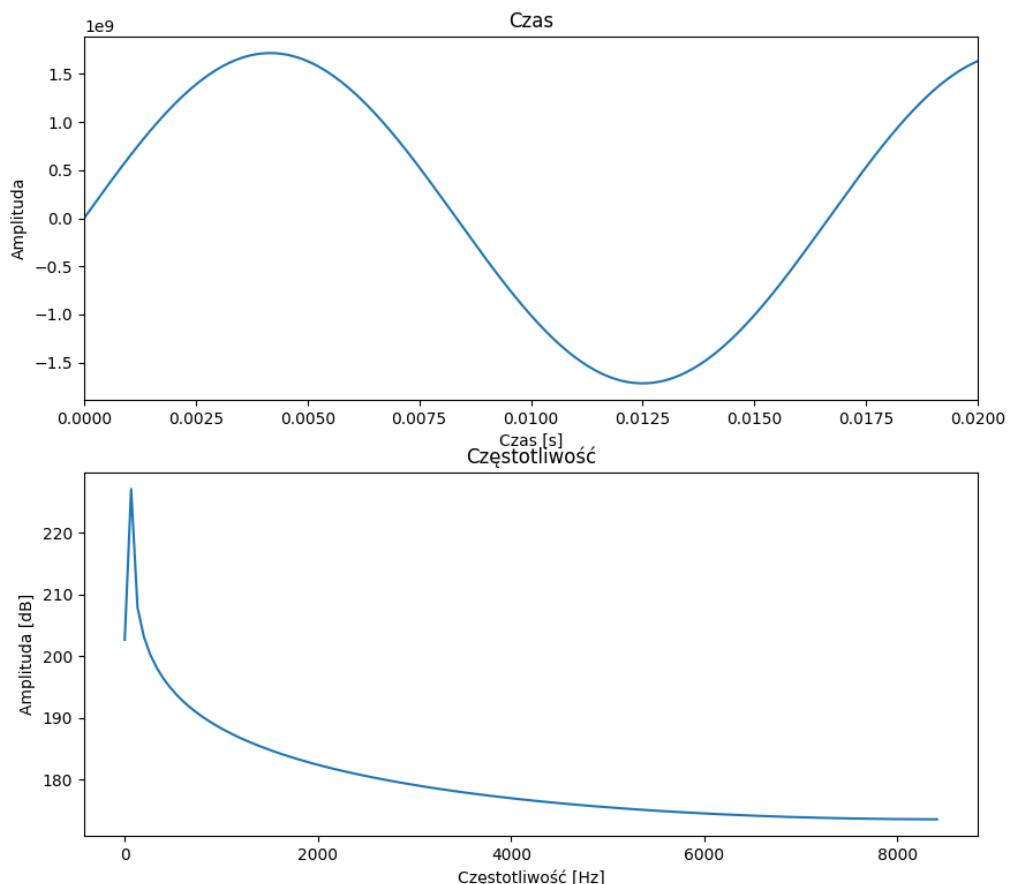
wartość losowa = [0.59570022]

Peak freq = 62.5

Peak amp = 226.9908227165433

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 16953



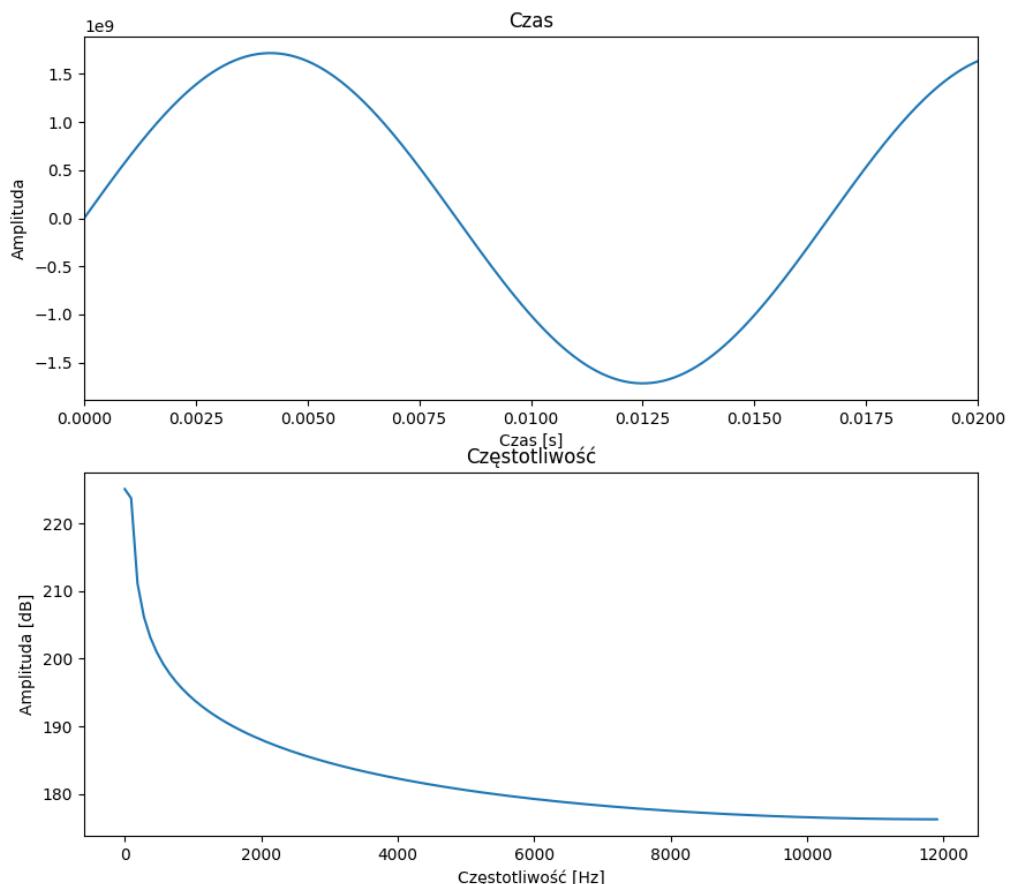
wartość losowa = [0.60035083]

Peak freq = 66.22265625

Peak amp = 227.06473466753442

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 24000



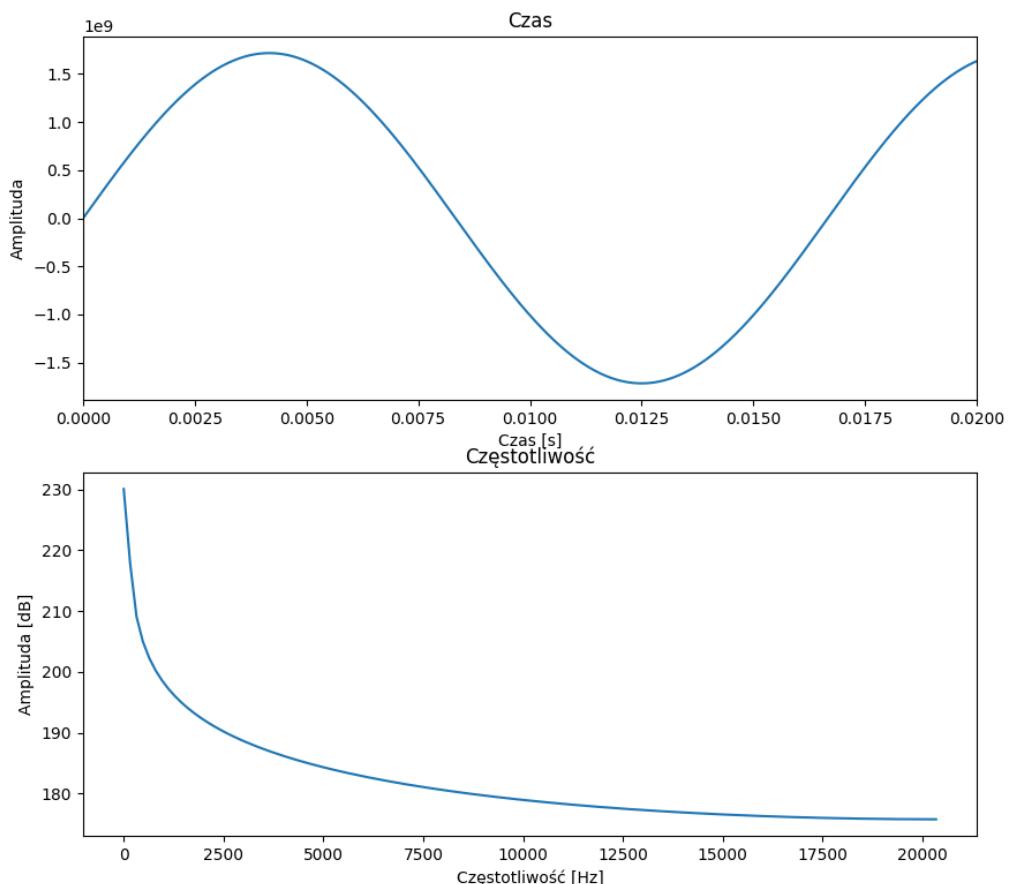
wartość losowa = [0.23838359]

Peak freq = 0.0

Peak amp = 225.09308687027868

Plik - SIN/sin\_60Hz.wav

Interpolacja liniowa, Fs 41000



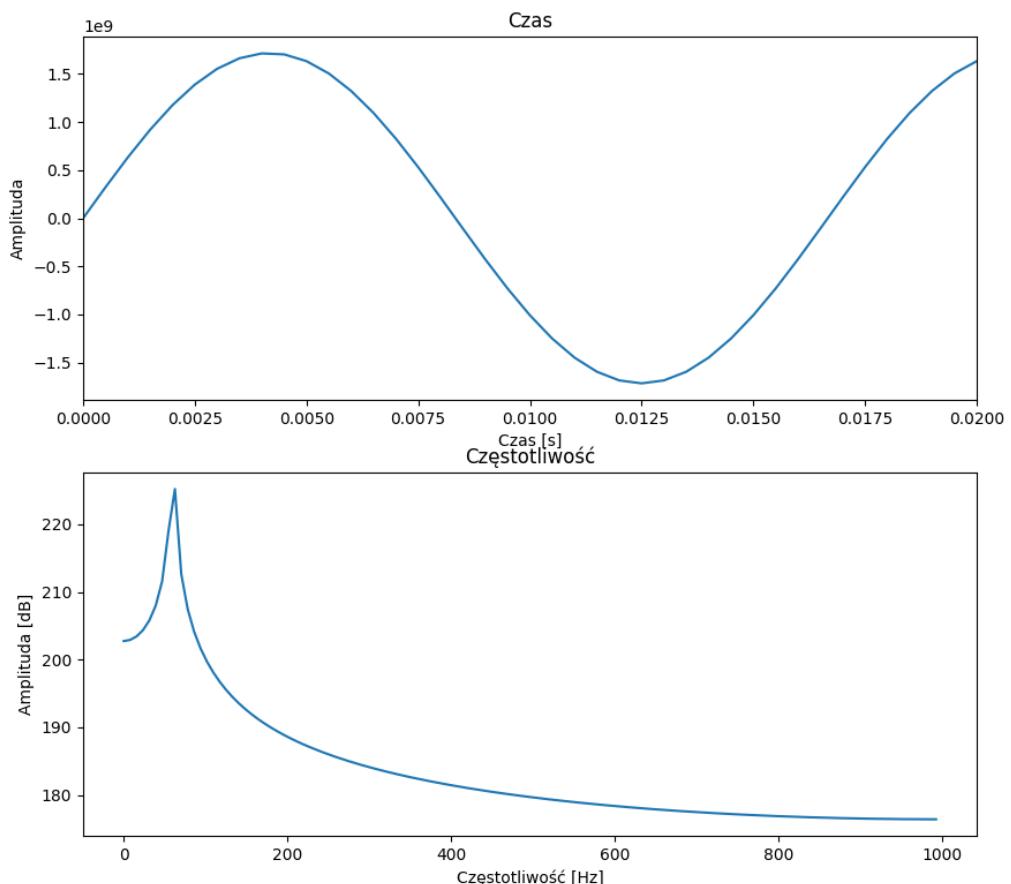
wartość losowa = [0.13685875]

Peak freq = 0.0

Peak amp = 230.04966544075742

## Plik - SIN/sin\_60Hz.wav

Interpolacja nieliniowa, Fs 2000



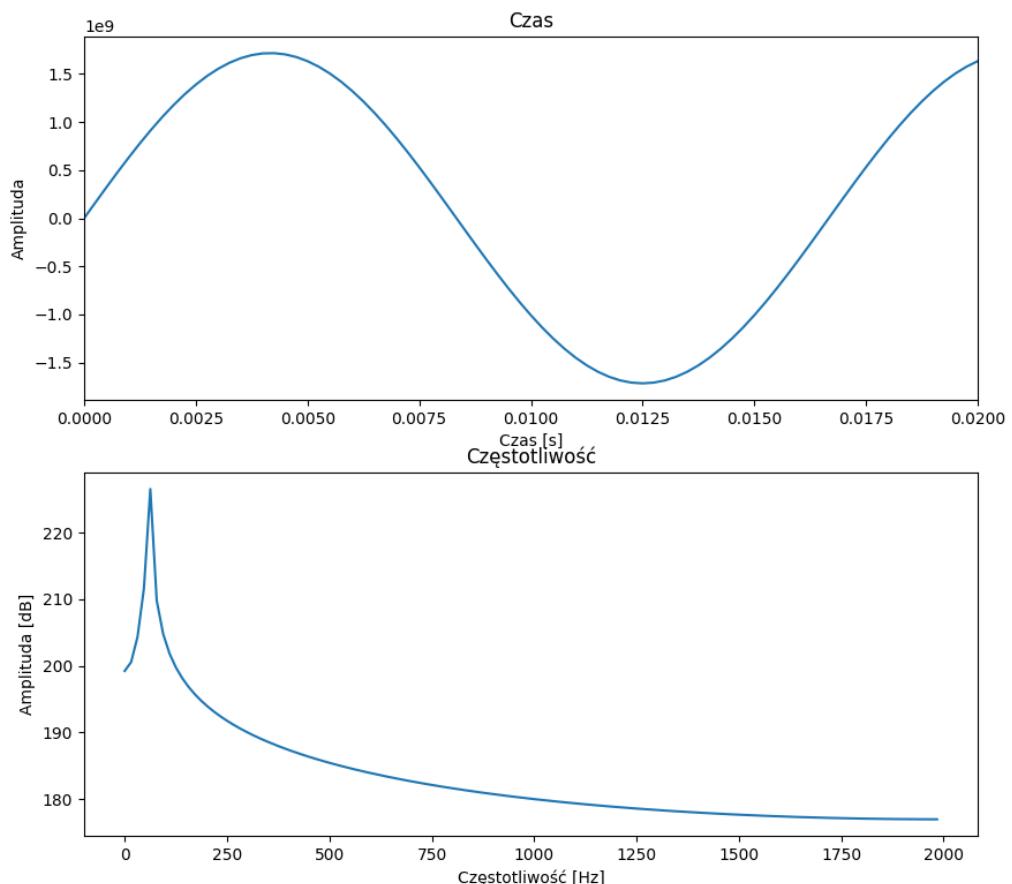
wartość losowa = [0.77107108]

Peak freq = 62.5

Peak amp = 225.2245968588228

Plik - SIN/sin\_60Hz.wav

Interpolacja nieliniowa, Fs 4000



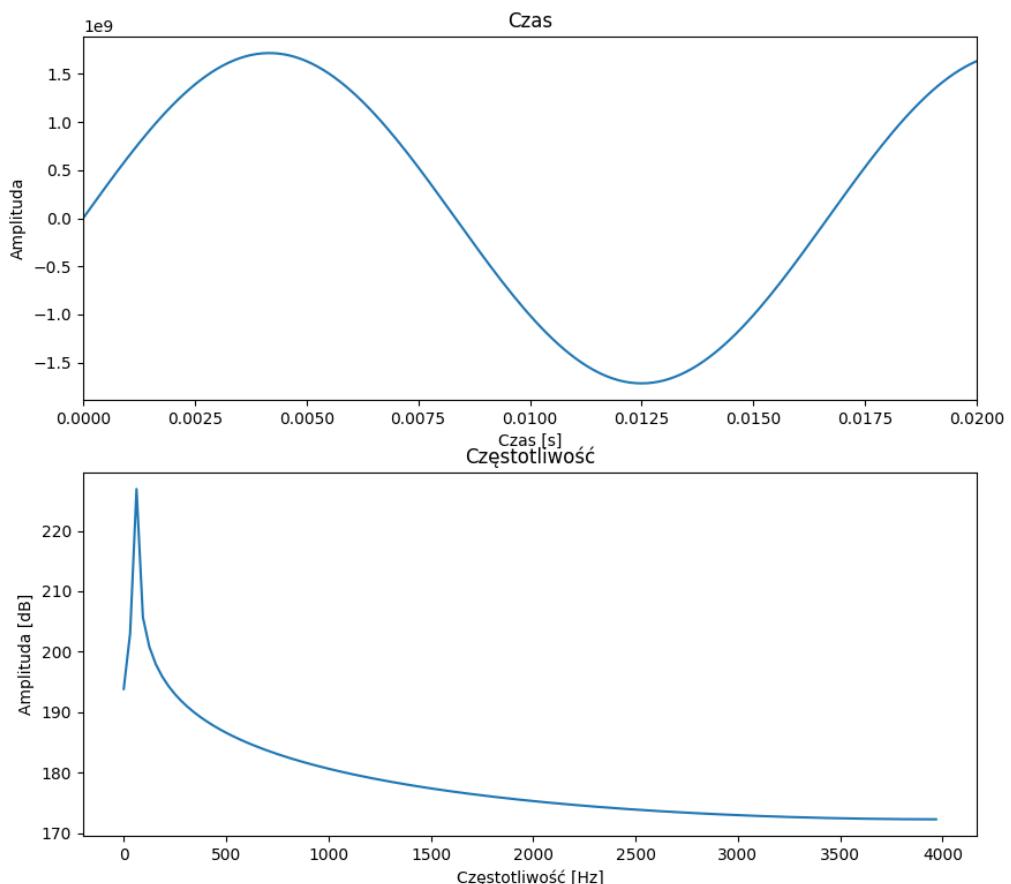
wartość losowa = [0.27652006]

Peak freq = 62.5

Peak amp = 226.55734791390415

**Plik - SIN/sin\_60Hz.wav**

**Interpolacja nieliniowa, Fs 8000**



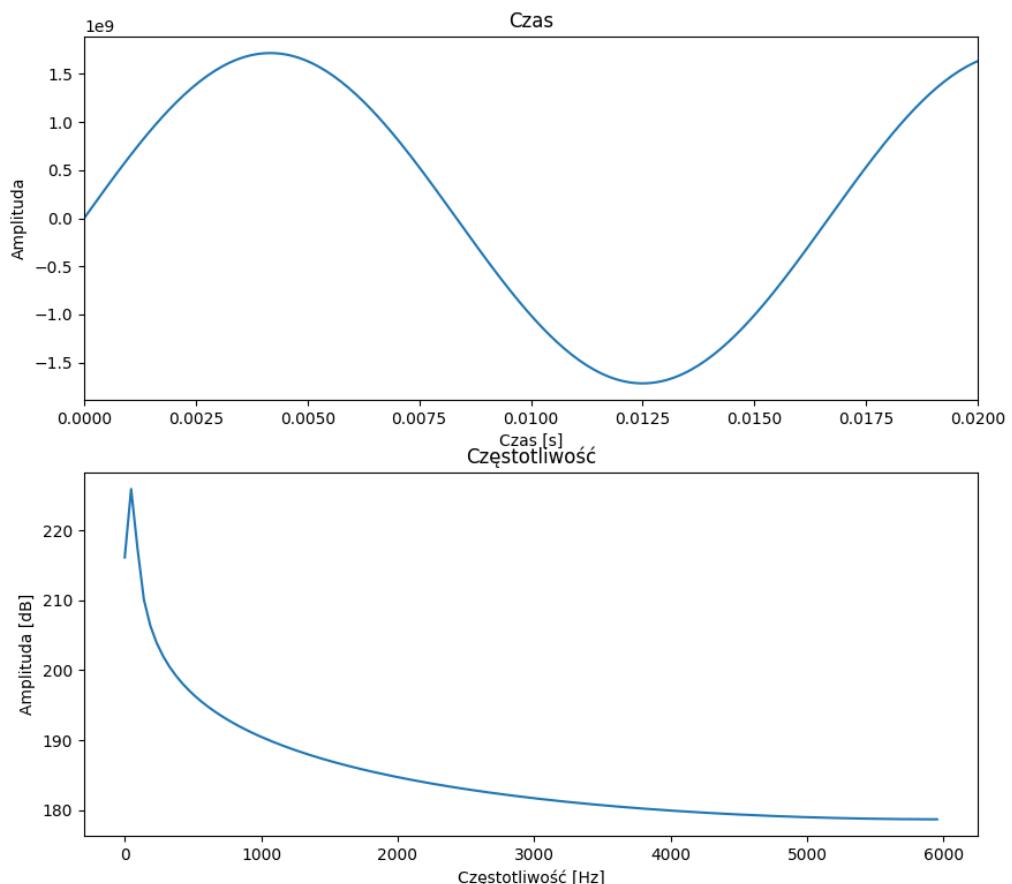
wartość losowa = [0.18631574]

Peak freq = 62.5

Peak amp = 226.90333966076088

## Plik - SIN/sin\_60Hz.wav

Interpolacja nieliniowa, Fs 11999



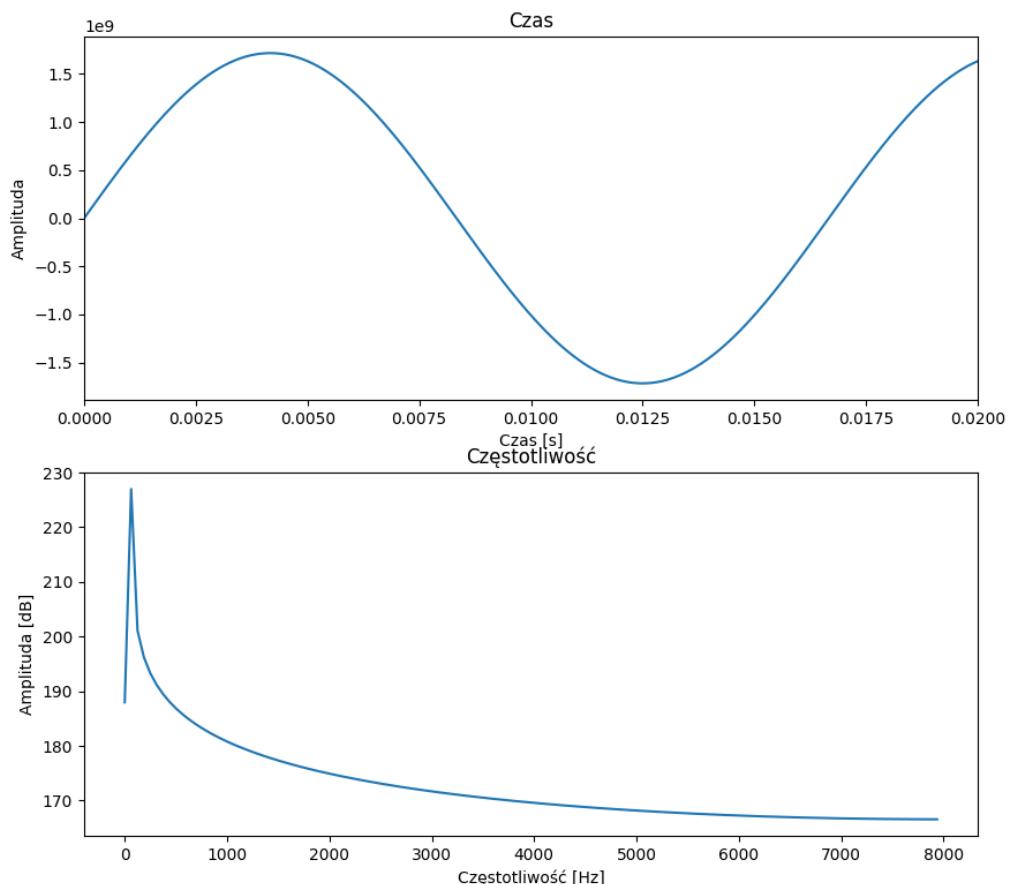
wartość losowa = [0.46968231]

Peak freq = 46.87109375

Peak amp = 225.9203173635865

**Plik - SIN/sin\_60Hz.wav**

**Interpolacja nieliniowa, Fs 16000**



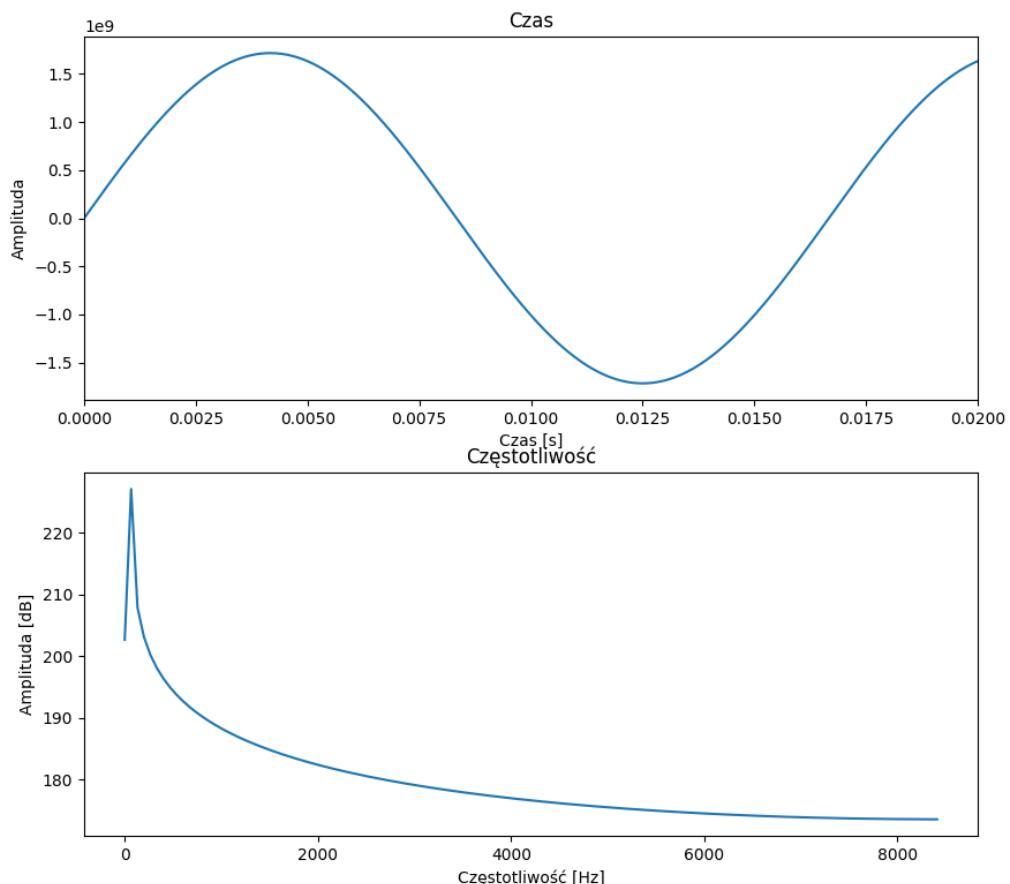
wartość losowa = [0.39117419]

Peak freq = 62.5

Peak amp = 226.9908227165433

**Plik - SIN/sin\_60Hz.wav**

**Interpolacja nieliniowa, Fs 16953**



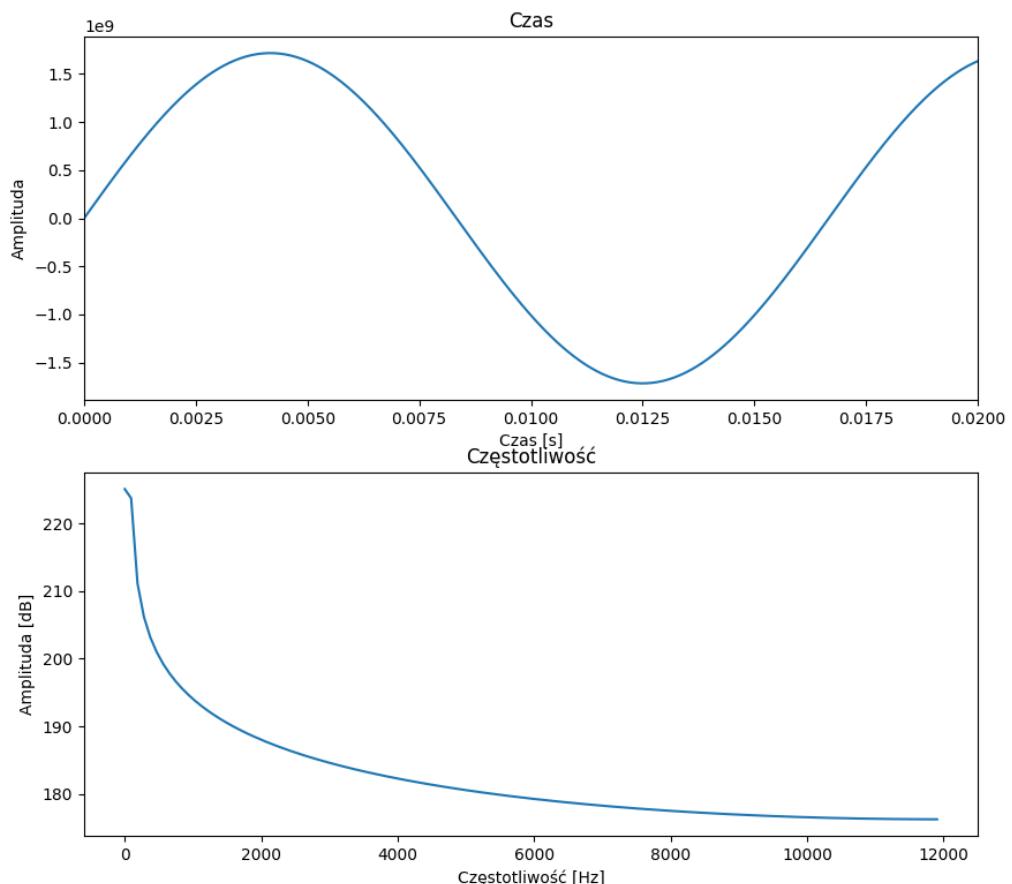
wartość losowa = [0.11660458]

Peak freq = 66.22265625

Peak amp = 227.06477931621262

**Plik - SIN/sin\_60Hz.wav**

**Interpolacja nieliniowa, Fs 24000**



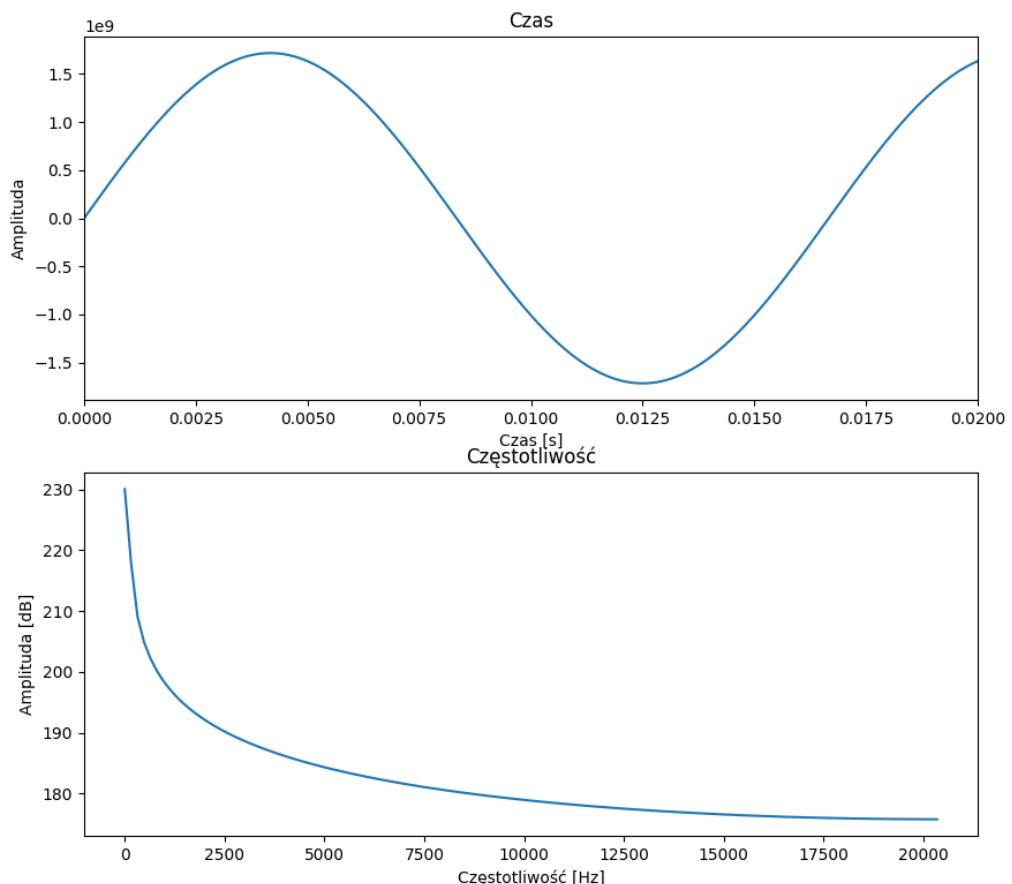
wartość losowa = [0.54709781]

Peak freq = 0.0

Peak amp = 225.09308687027868

**Plik - SIN/sin\_60Hz.wav**

**Interpolacja nieliniowa, Fs 41000**



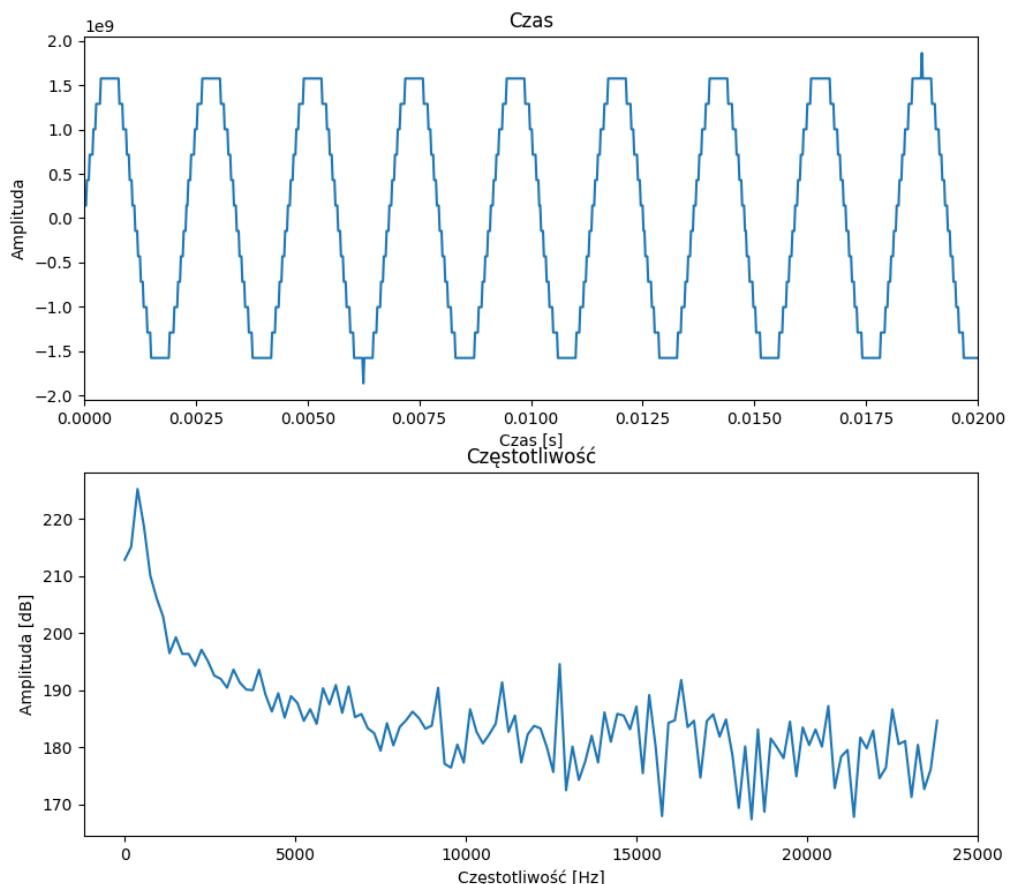
wartość losowa = [0.39691799]

Peak freq = 0.0

Peak amp = 230.04971010399248

## Plik - SIN/sin\_440Hz.wav

### Kwantyzacja, Bit 4



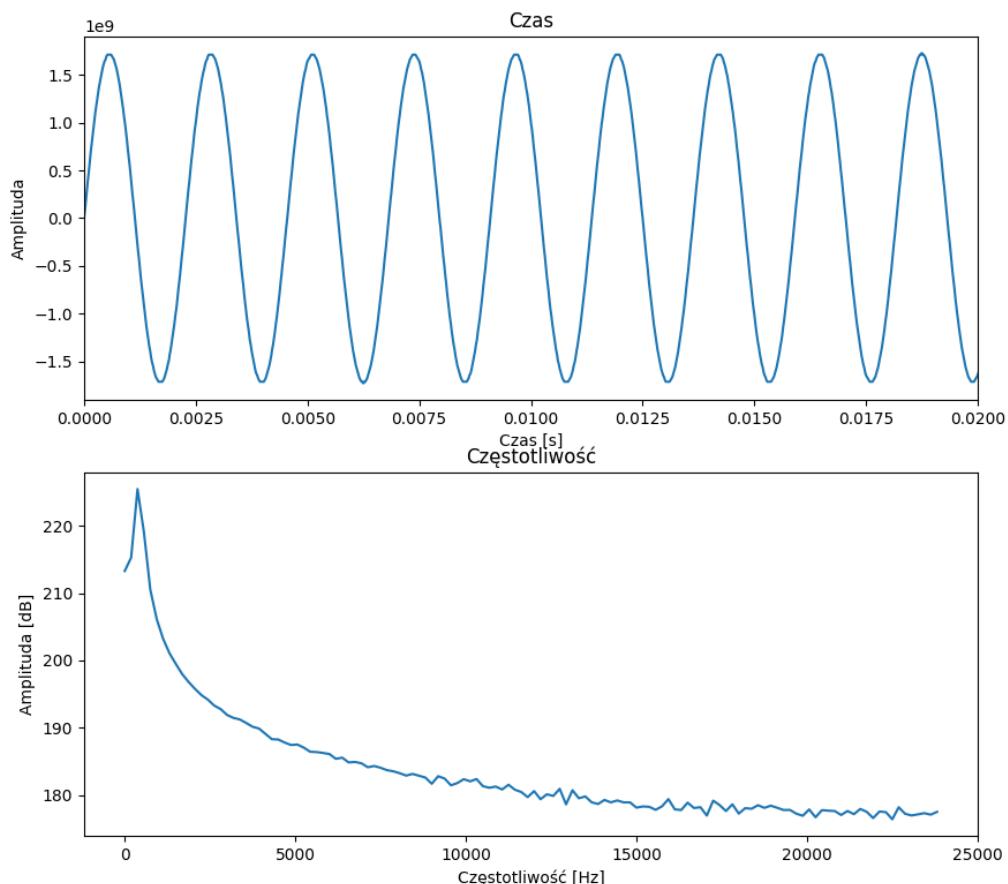
wartość losowa = [0.58070946]

Peak freq = 375.0

Peak amp = 225.2337984679901

## Plik - SIN/sin\_440Hz.wav

### Kwantyzacja, Bit 8



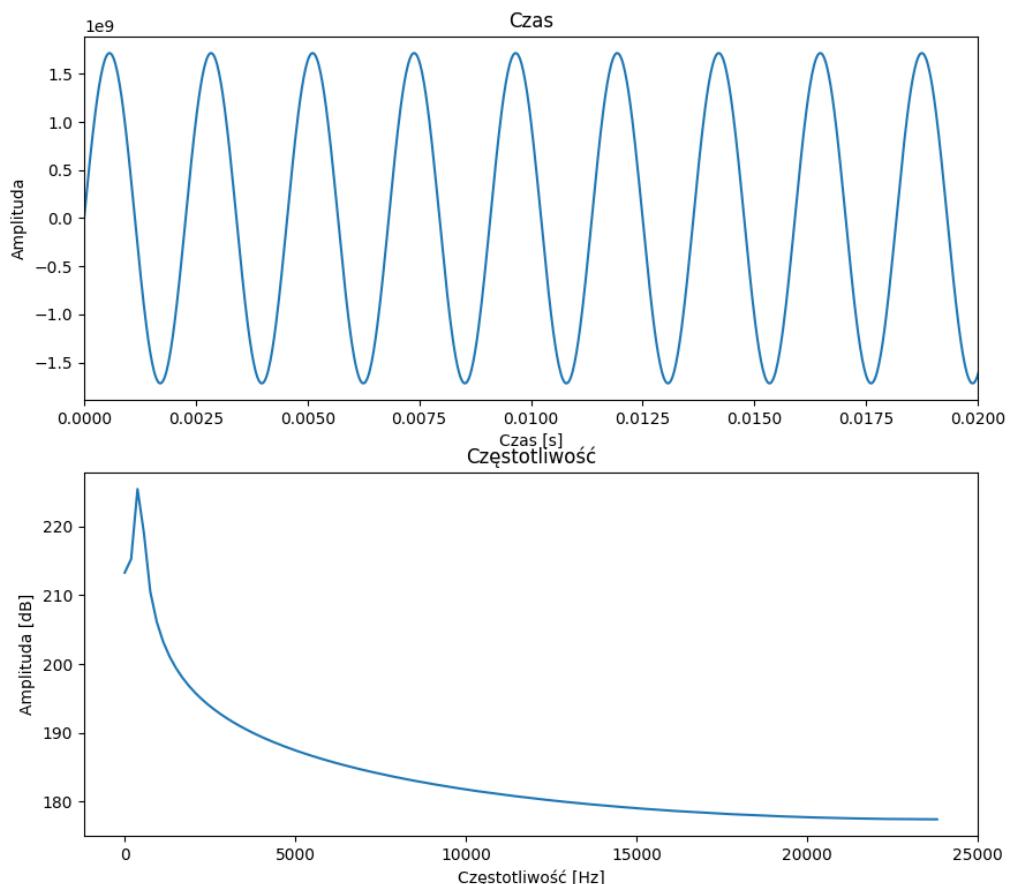
wartość losowa = [0.87461427]

Peak freq = 375.0

Peak amp = 225.4242773056452

## Plik - SIN/sin\_440Hz.wav

### Kwantyzacja, Bit 16



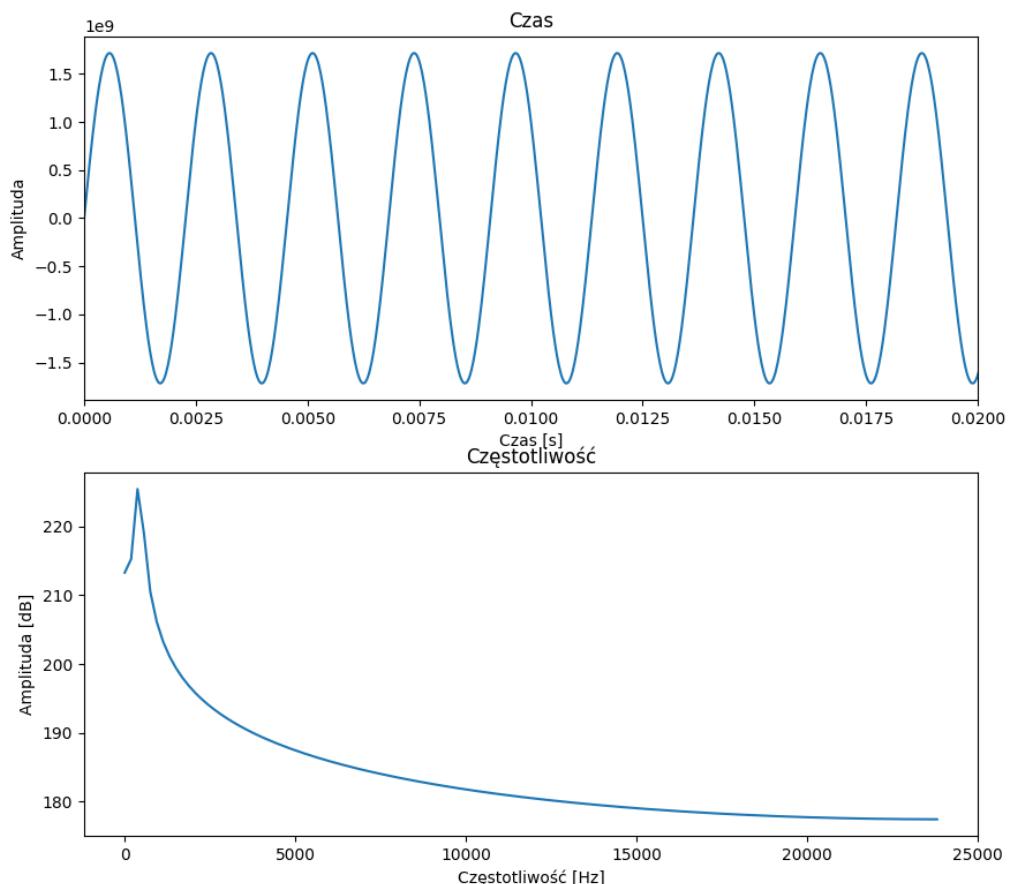
wartość losowa = [0.79208778]

Peak freq = 375.0

Peak amp = 225.42732422983178

## Plik - SIN/sin\_440Hz.wav

### Kwantyzacja, Bit 24



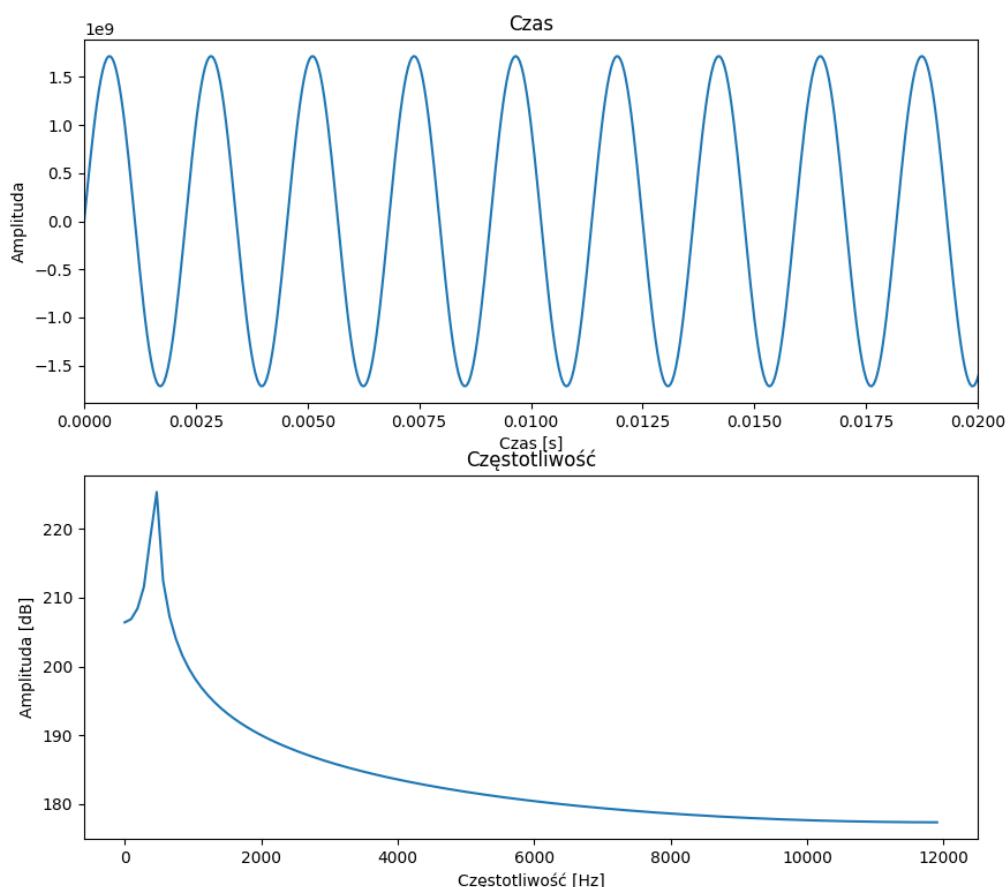
wartość losowa = [0.69709684]

Peak freq = 375.0

Peak amp = 225.42732017323837

## Plik - SIN/sin\_440Hz.wav

### Decymacja, N 2



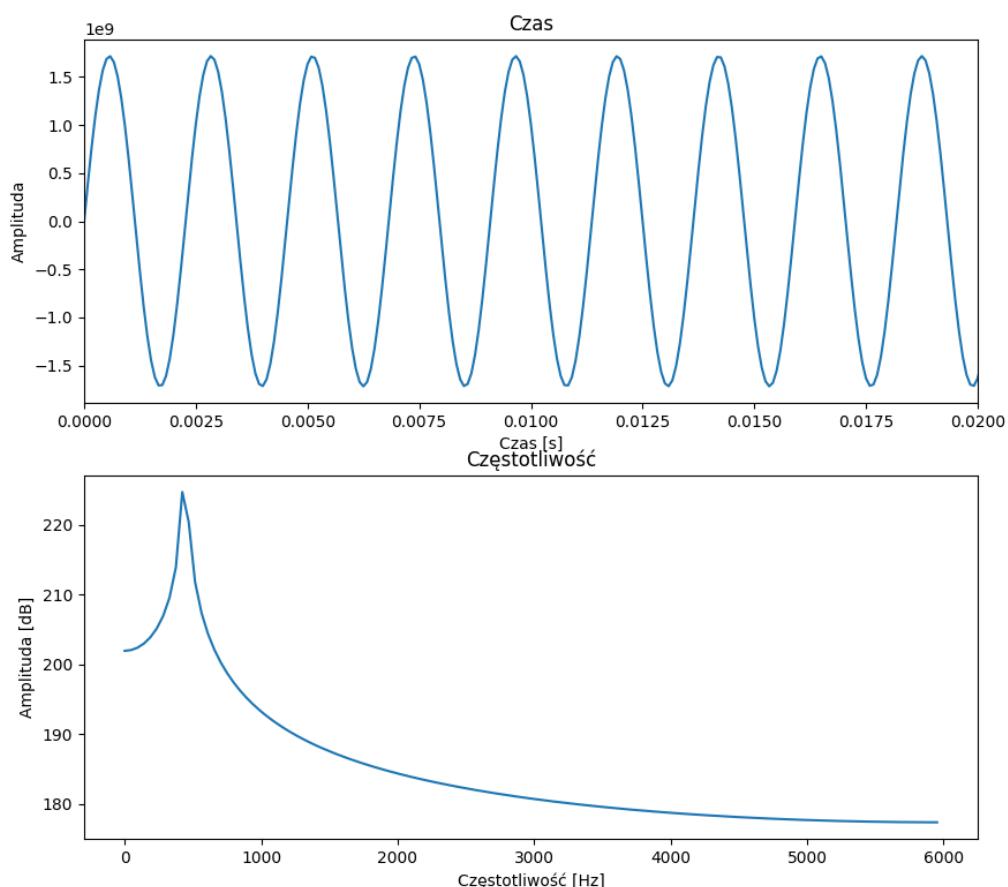
wartość losowa = [0.70283565]

Peak freq = 468.75

Peak amp = 225.3343402609009

## Plik - SIN/sin\_440Hz.wav

Decymacja, N 4



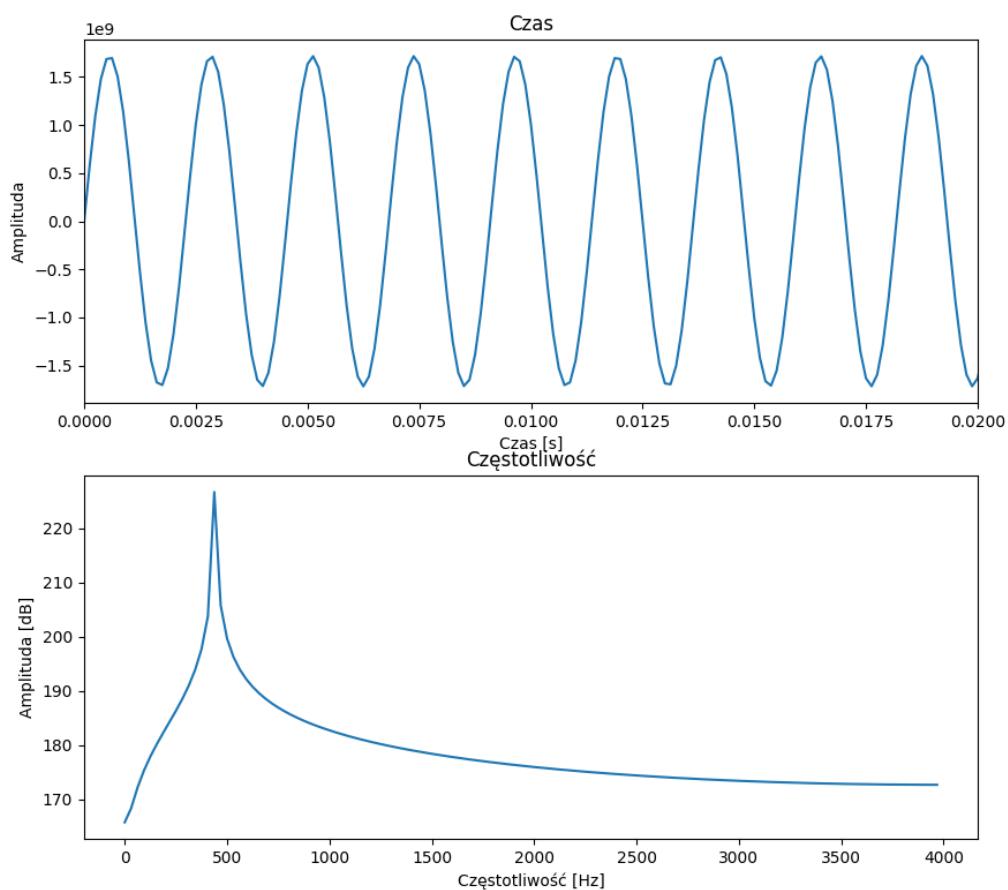
wartość losowa = [0.8032839]

Peak freq = 421.875

Peak amp = 224.7011623367399

## Plik - SIN/sin\_440Hz.wav

Decymacja, N 6



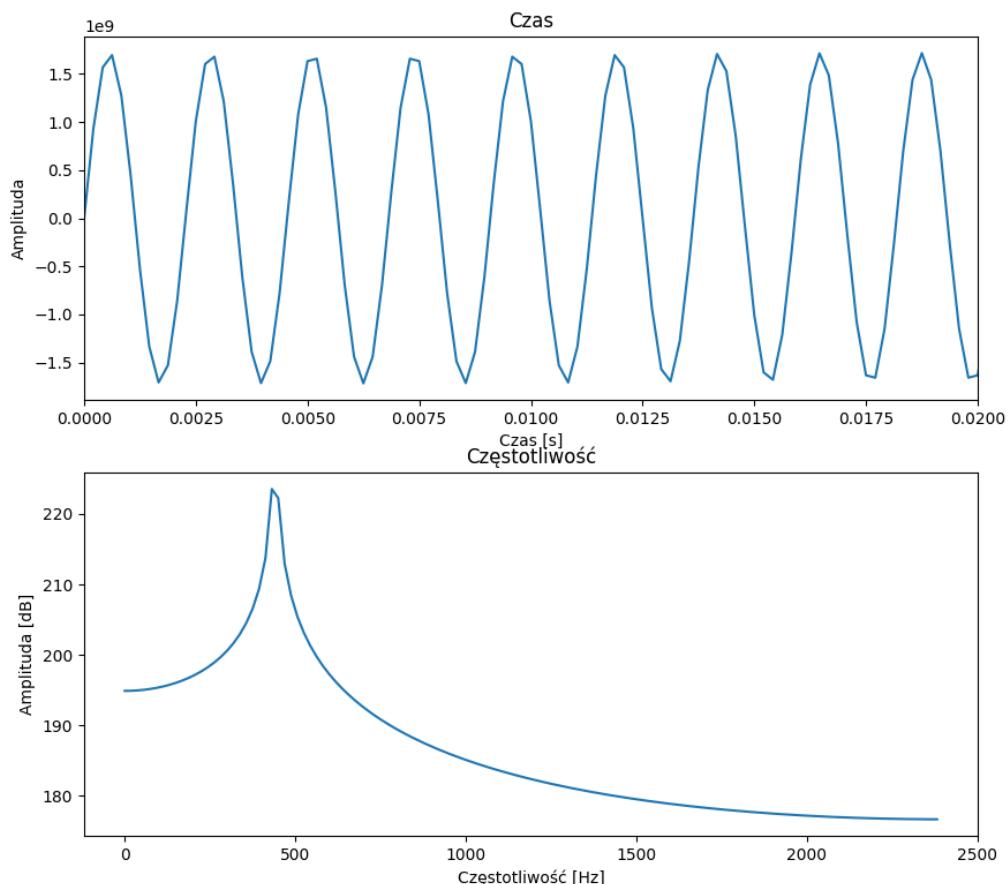
wartość losowa = [0.11891457]

Peak freq = 437.5

Peak amp = 226.72799637817786

## Plik - SIN/sin\_440Hz.wav

Decymacja, N 10



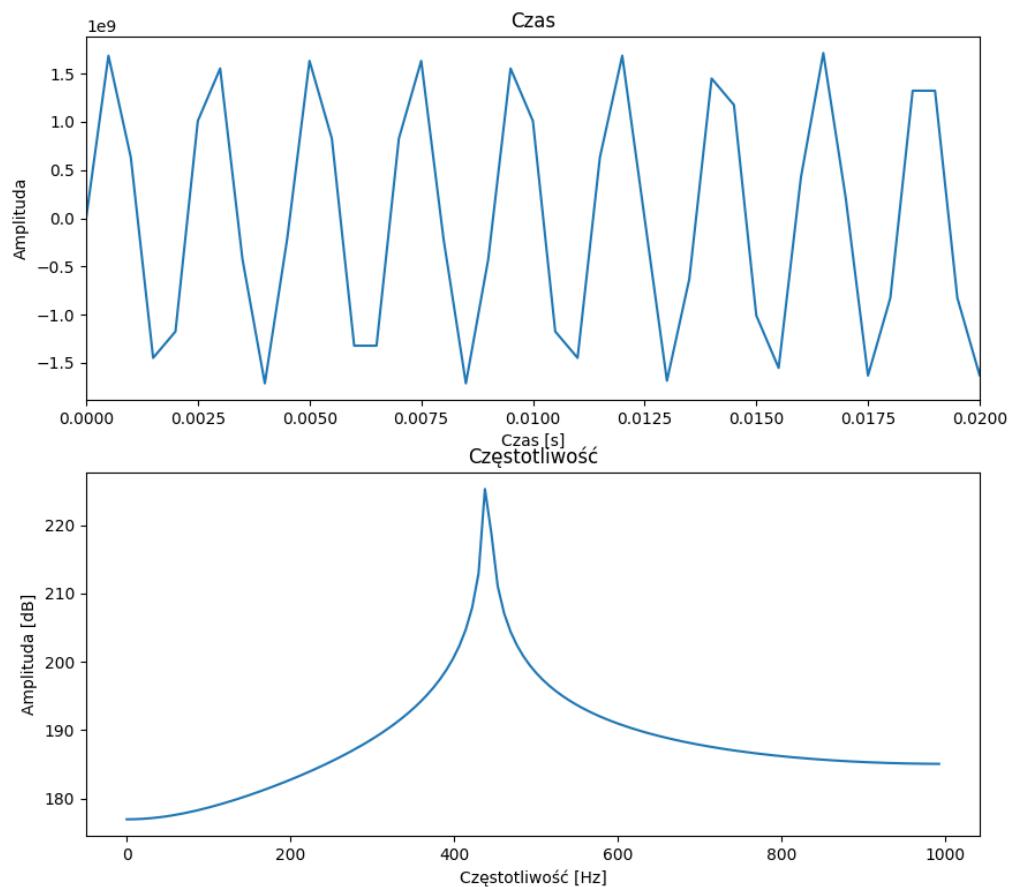
wartość losowa = [0.6108421]

Peak freq = 431.25

Peak amp = 223.5389522409331

## Plik - SIN/sin\_440Hz.wav

Decymacja, N 24



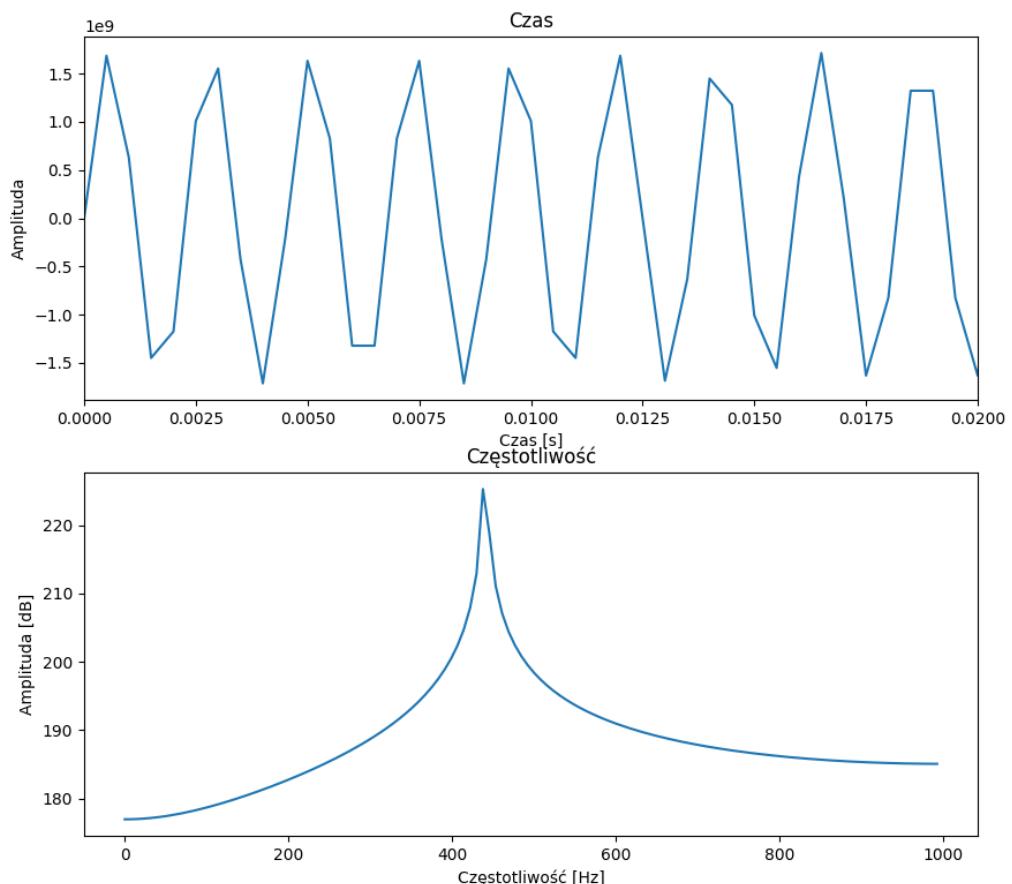
wartość losowa = [0.92899593]

Peak freq = 437.5

Peak amp = 225.30070960865447

**Plik - SIN/sin\_440Hz.wav**

**Interpolacja liniowa, Fs 2000**



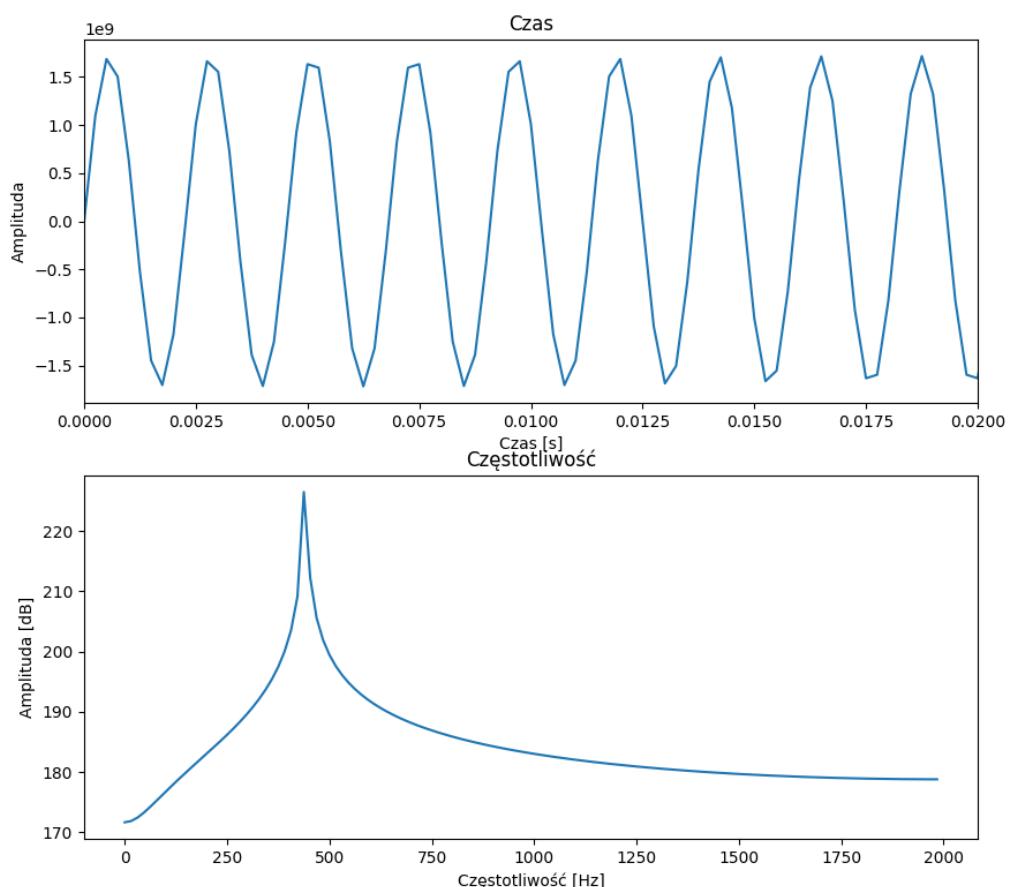
wartość losowa = [0.92570693]

Peak freq = 437.5

Peak amp = 225.30070960865447

Plik - SIN/sin\_440Hz.wav

Interpolacja liniowa, Fs 4000



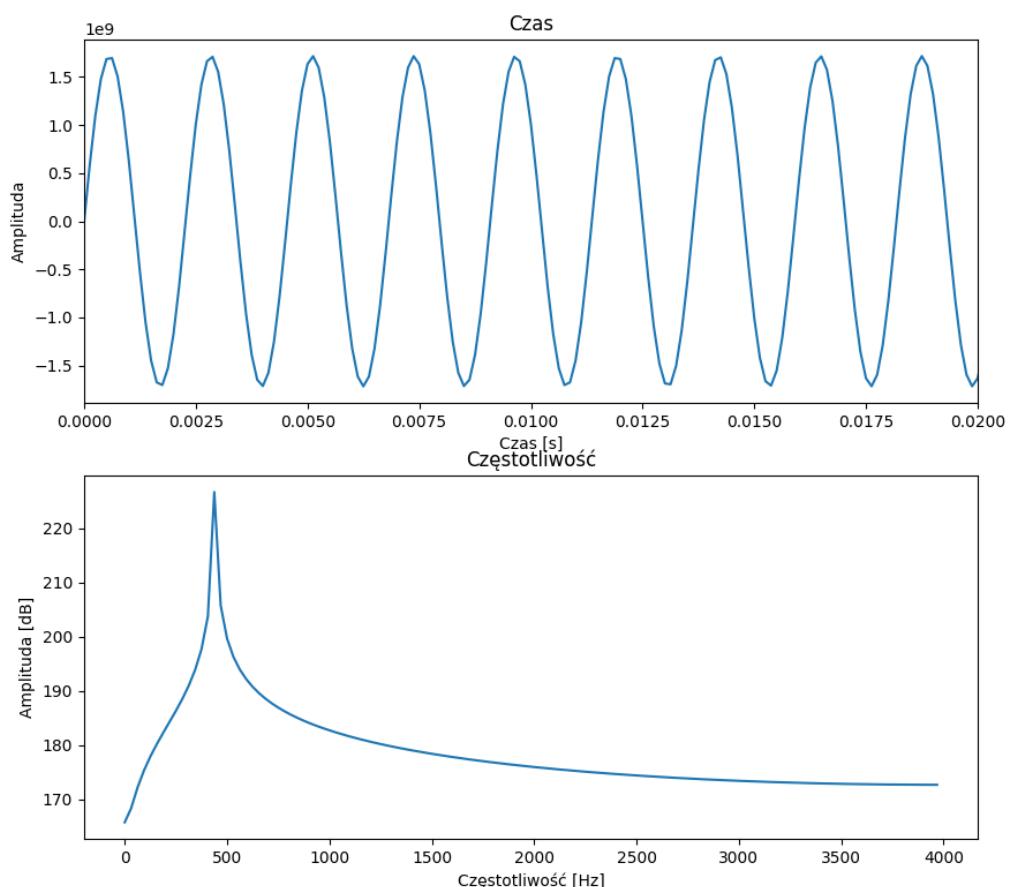
wartość losowa = [0.64108074]

Peak freq = 437.5

Peak amp = 226.45016544928663

**Plik - SIN/sin\_440Hz.wav**

**Interpolacja liniowa, Fs 8000**



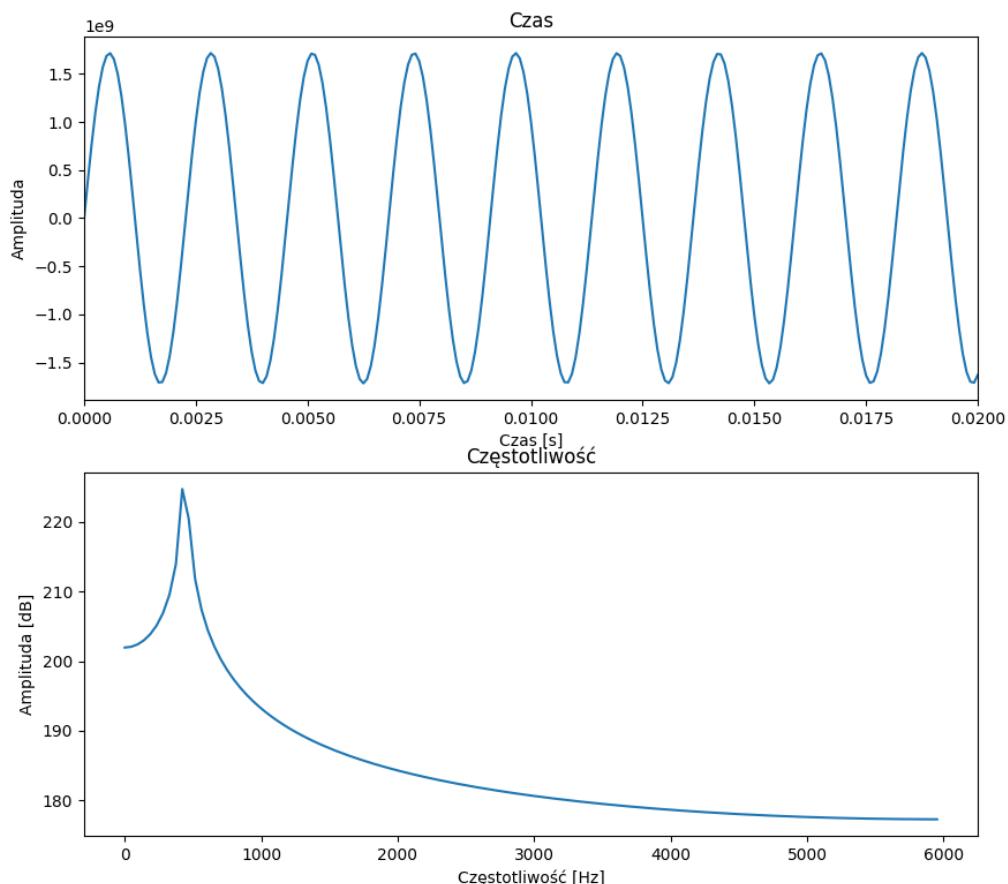
wartość losowa = [0.95876055]

Peak freq = 437.5

Peak amp = 226.72799637817786

**Plik - SIN/sin\_440Hz.wav**

**Interpolacja liniowa, Fs 11999**



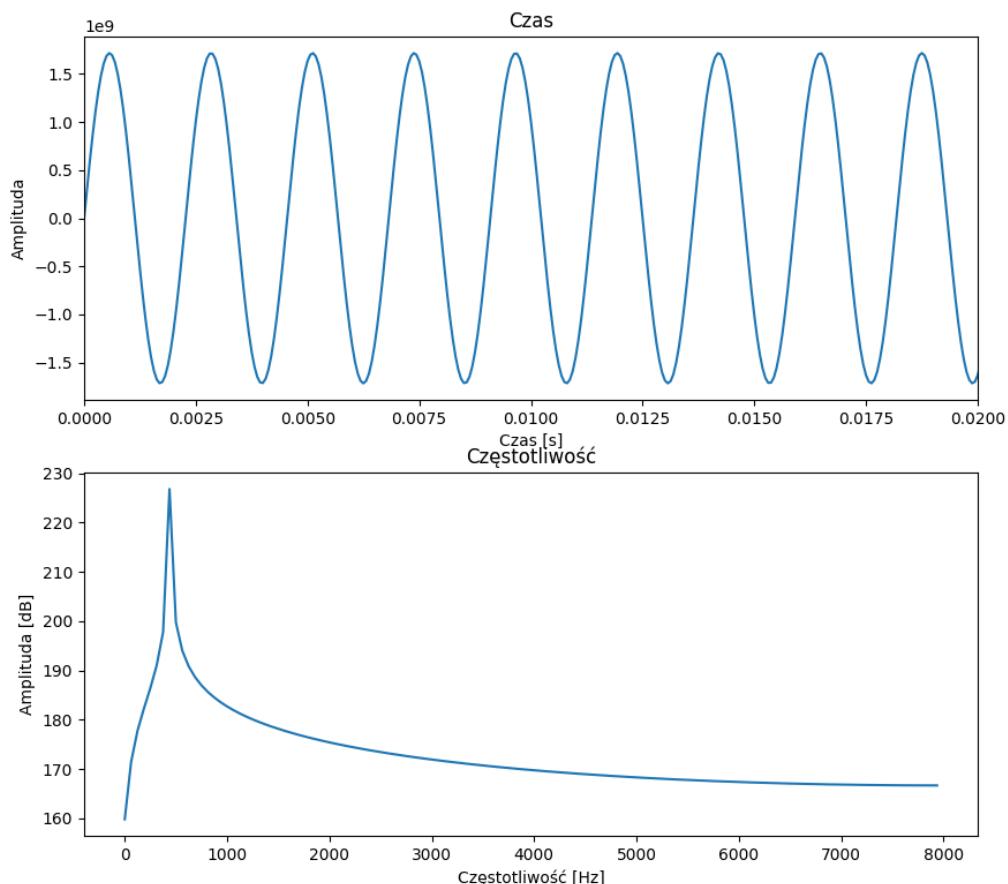
wartość losowa = [0.18851531]

Peak freq = 421.83984375

Peak amp = 224.6918681616988

Plik - SIN/sin\_440Hz.wav

Interpolacja liniowa, Fs 16000



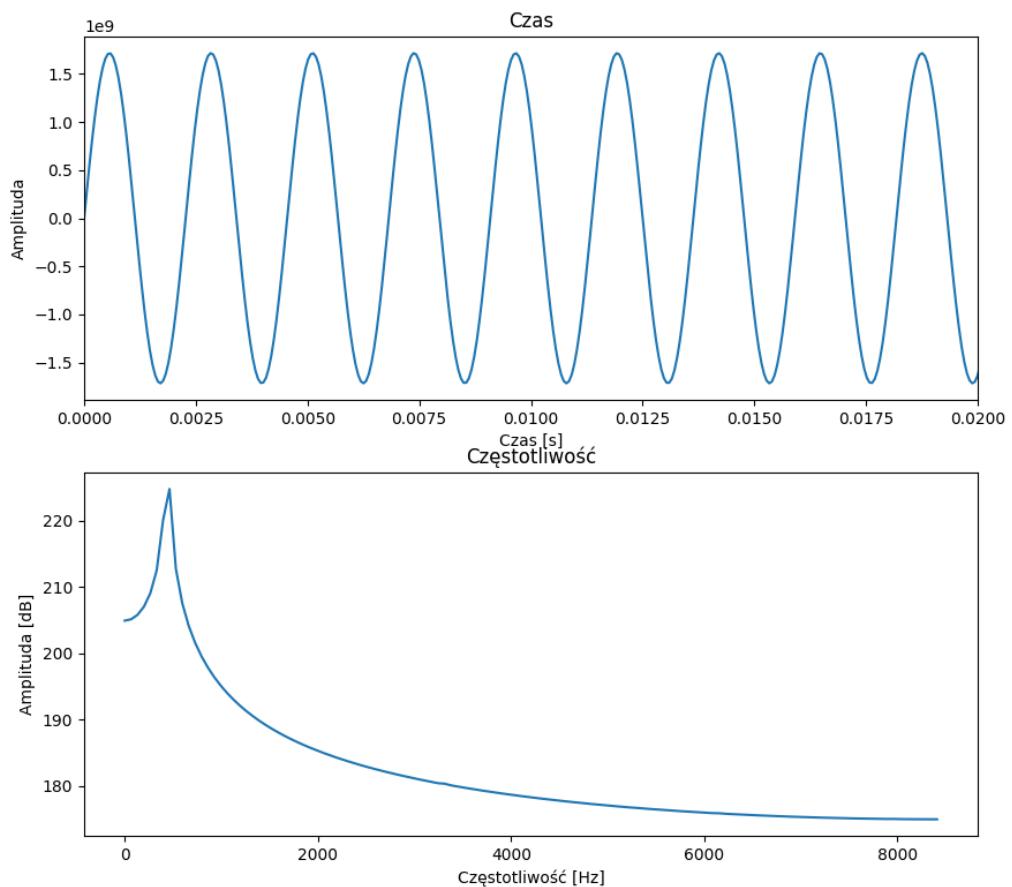
wartość losowa = [0.42015197]

Peak freq = 437.5

Peak amp = 226.79689700961234

Plik - SIN/sin\_440Hz.wav

Interpolacja liniowa, Fs 16953



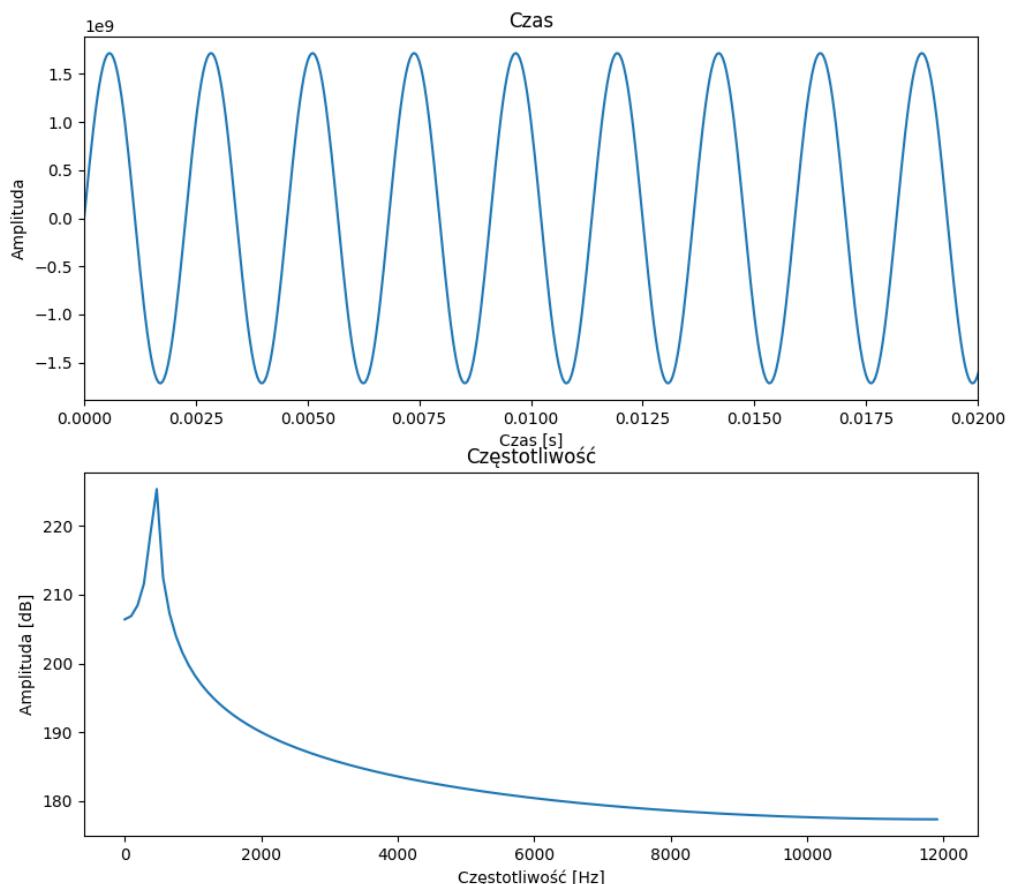
wartość losowa = [0.5481667]

Peak freq = 463.55859375

Peak amp = 224.78441031163285

Plik - SIN/sin\_440Hz.wav

Interpolacja liniowa, Fs 24000



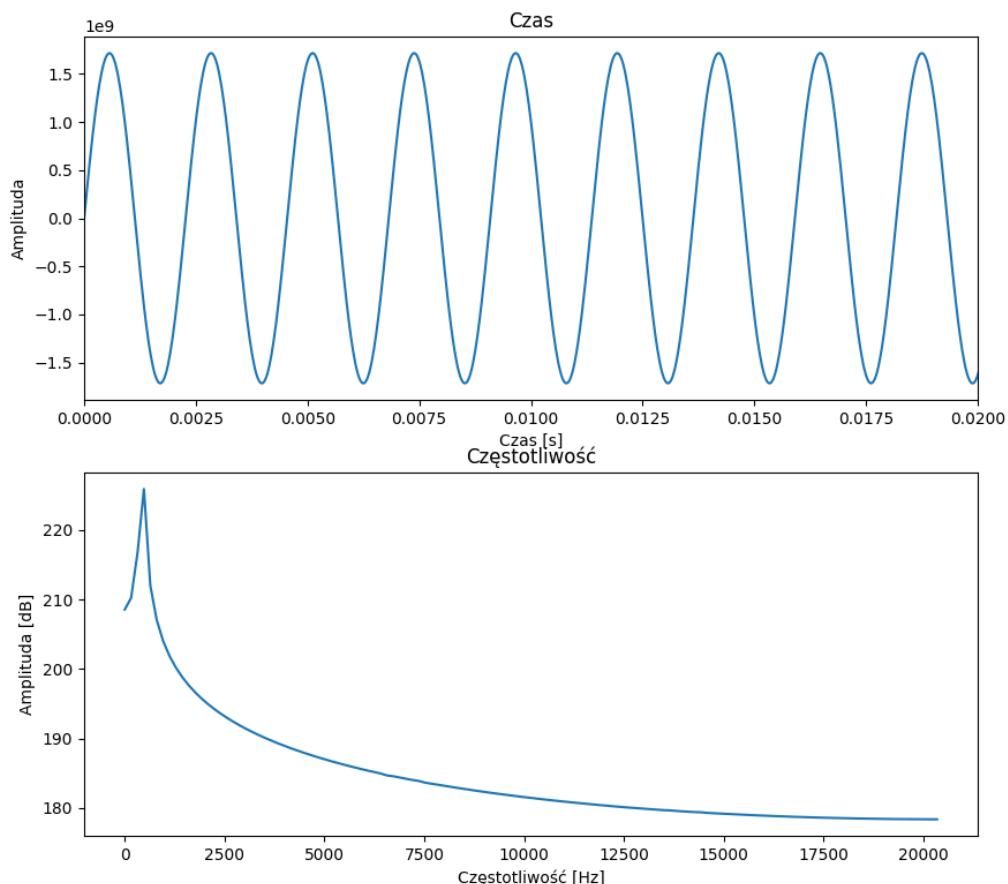
wartość losowa = [0.81021142]

Peak freq = 468.75

Peak amp = 225.3343402609009

**Plik - SIN/sin\_440Hz.wav**

**Interpolacja liniowa, Fs 41000**



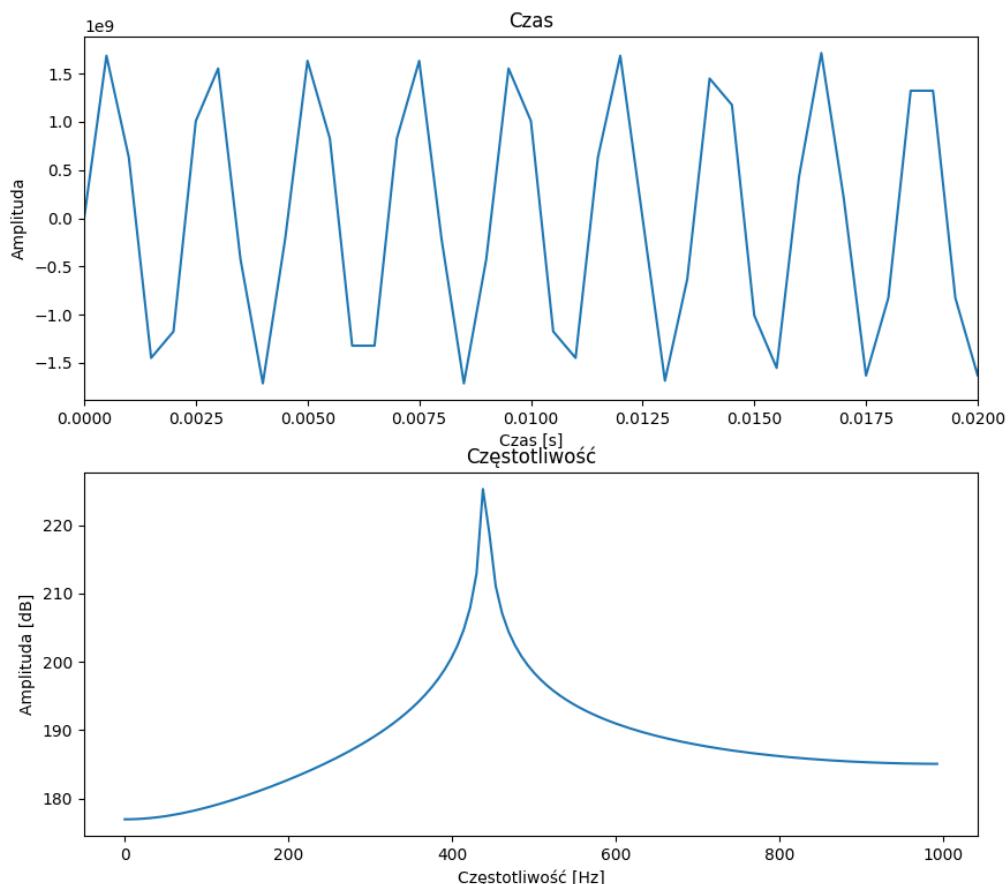
wartość losowa = [0.29313454]

Peak freq = 480.46875

Peak amp = 225.8861673923465

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 2000



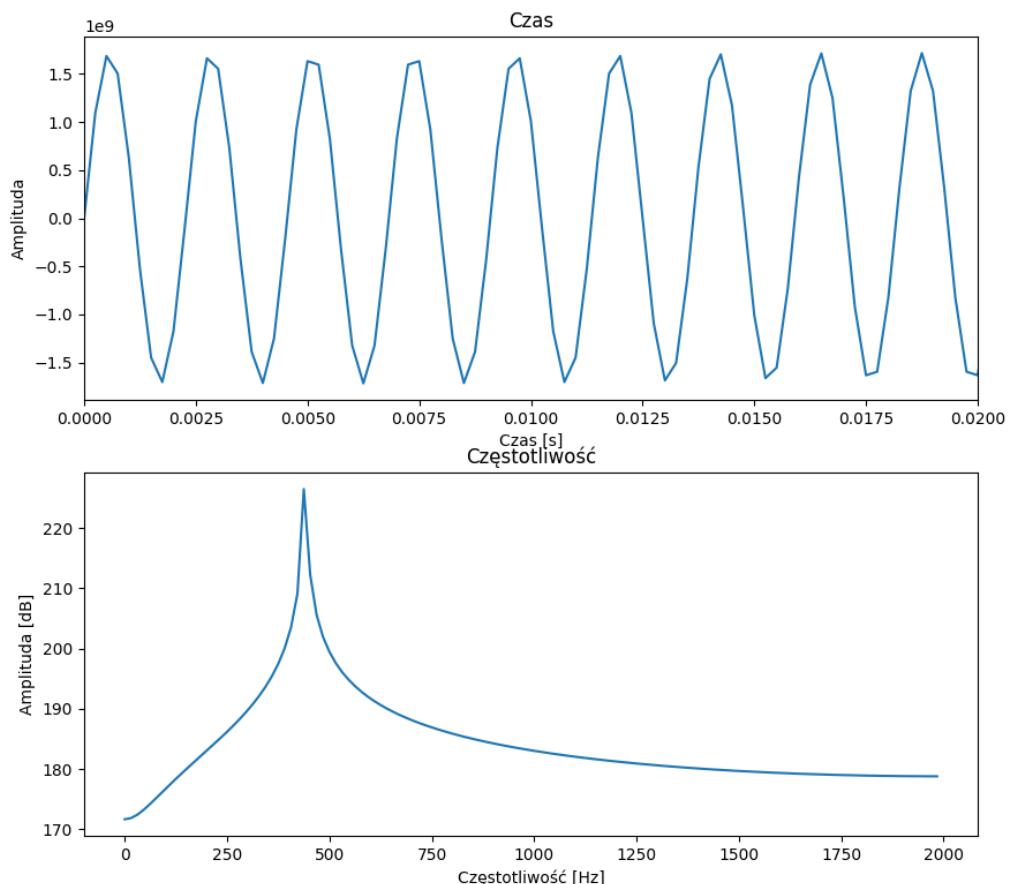
wartość losowa = [0.24790469]

Peak freq = 437.5

Peak amp = 225.30070960865447

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 4000



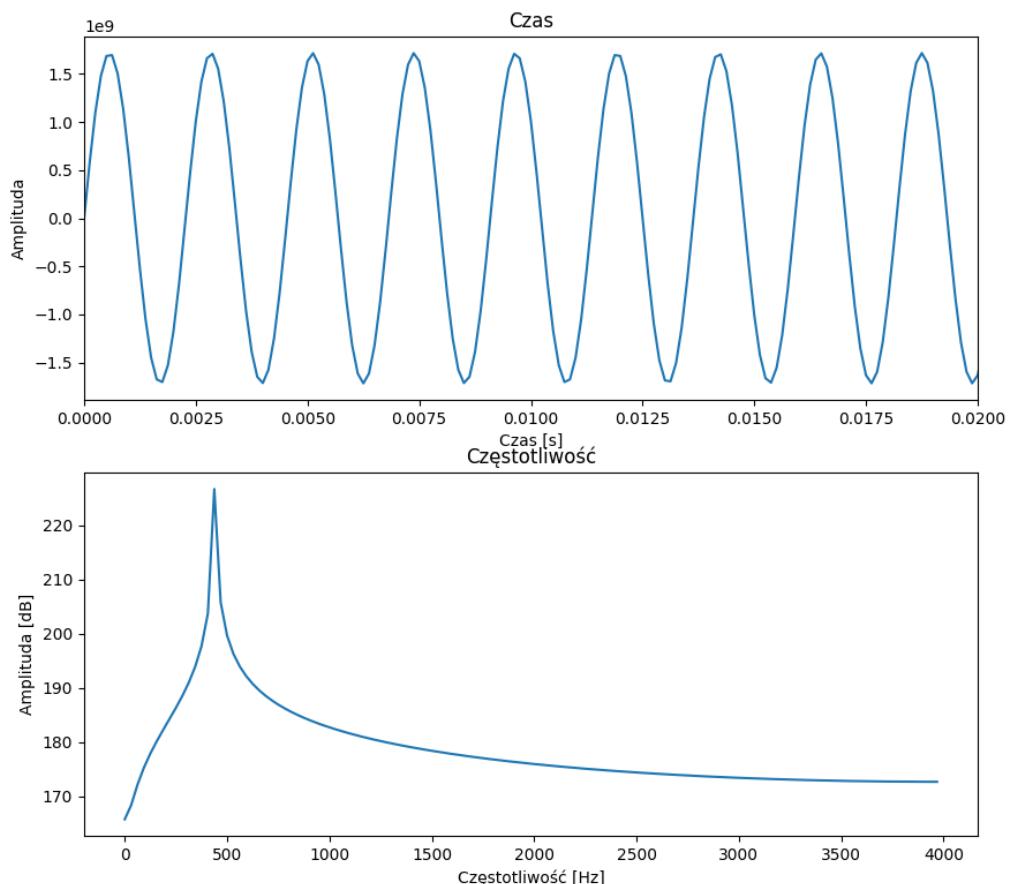
wartość losowa = [0.0870263]

Peak freq = 437.5

Peak amp = 226.45016544928663

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 8000



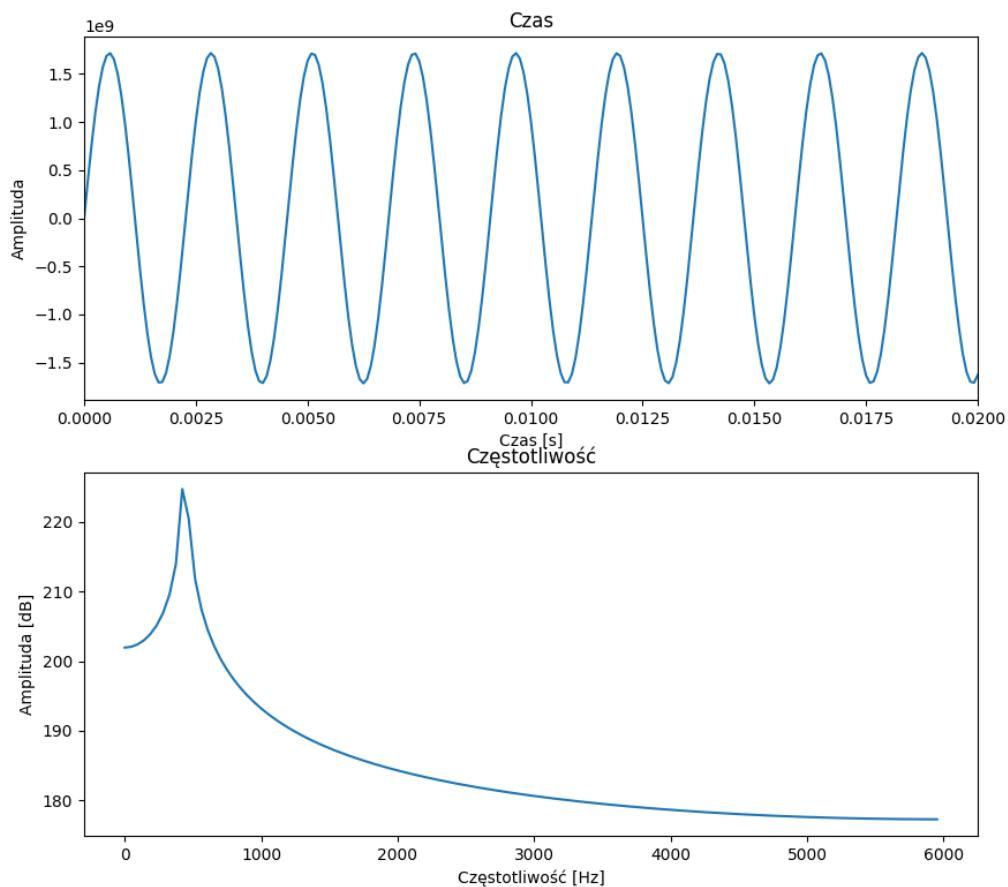
wartość losowa = [0.04858527]

Peak freq = 437.5

Peak amp = 226.72799637817786

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 11999



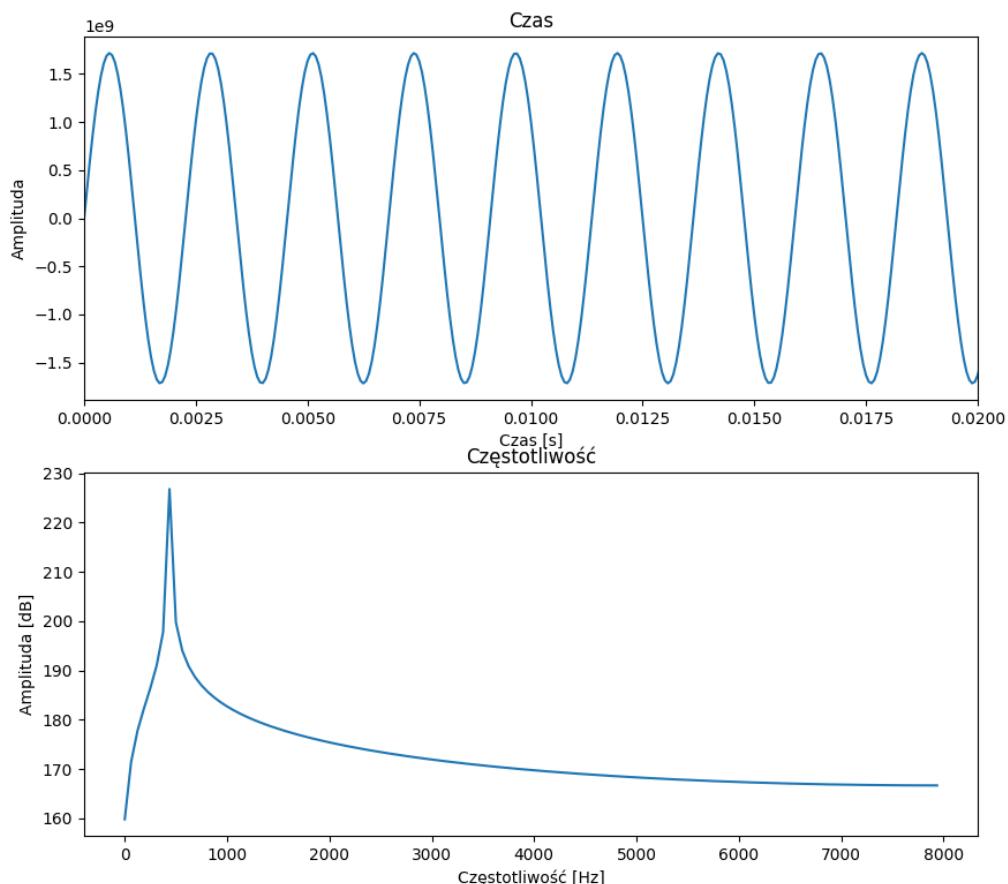
wartość losowa = [0.38323493]

Peak freq = 421.83984375

Peak amp = 224.69244466699416

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 16000



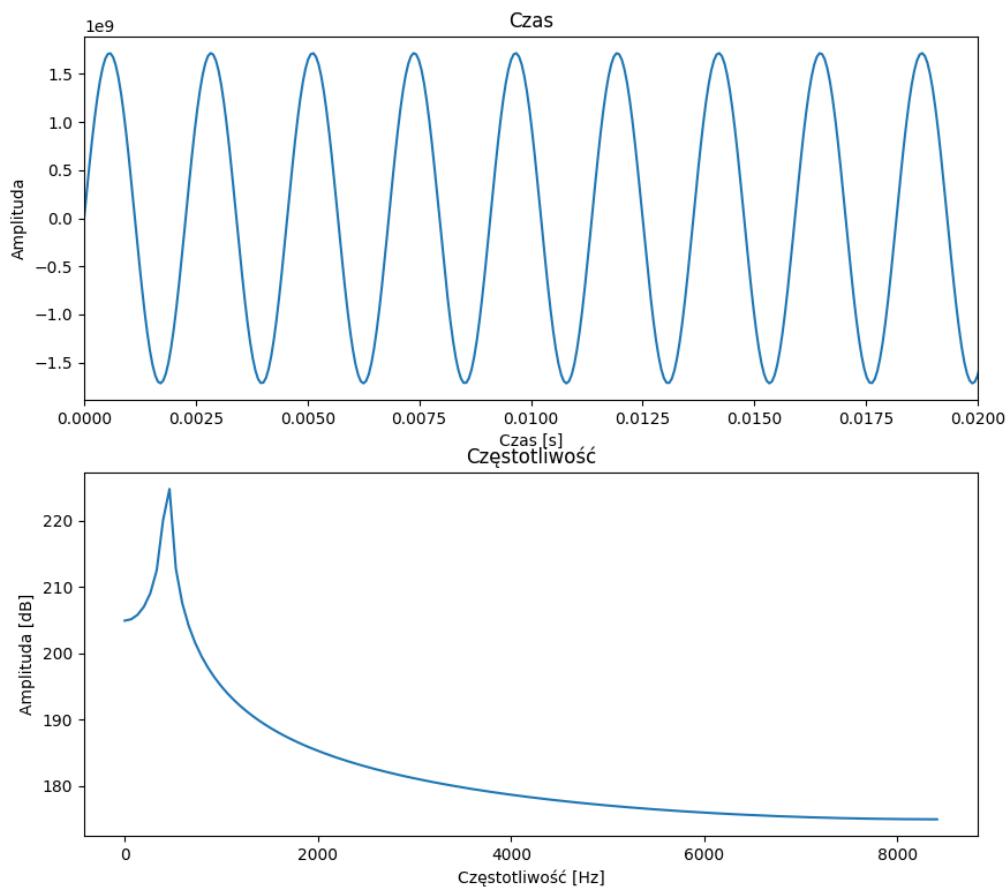
wartość losowa = [0.93685035]

Peak freq = 437.5

Peak amp = 226.79689700961234

**Plik - SIN/sin\_440Hz.wav**

**Interpolacja nieliniowa, Fs 16953**



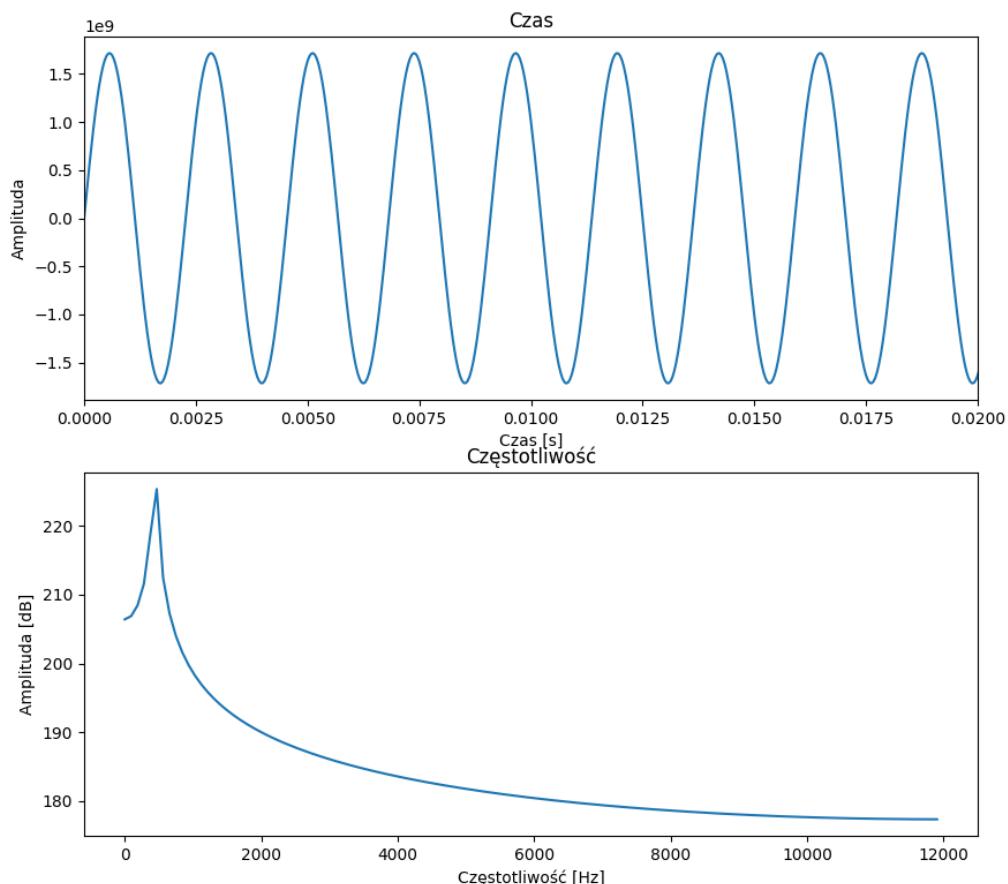
wartość losowa = [0.18996496]

Peak freq = 463.55859375

Peak amp = 224.78680161070017

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 24000



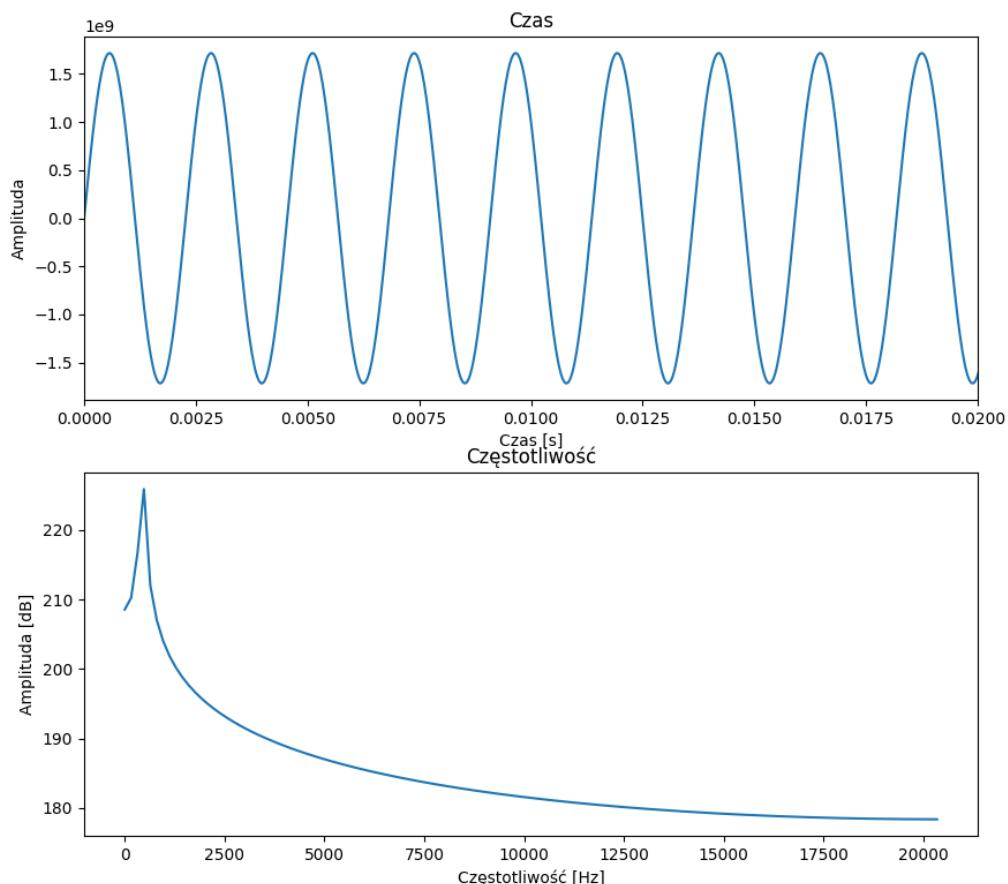
wartość losowa = [0.32445838]

Peak freq = 468.75

Peak amp = 225.3343402609009

## Plik - SIN/sin\_440Hz.wav

Interpolacja nieliniowa, Fs 41000



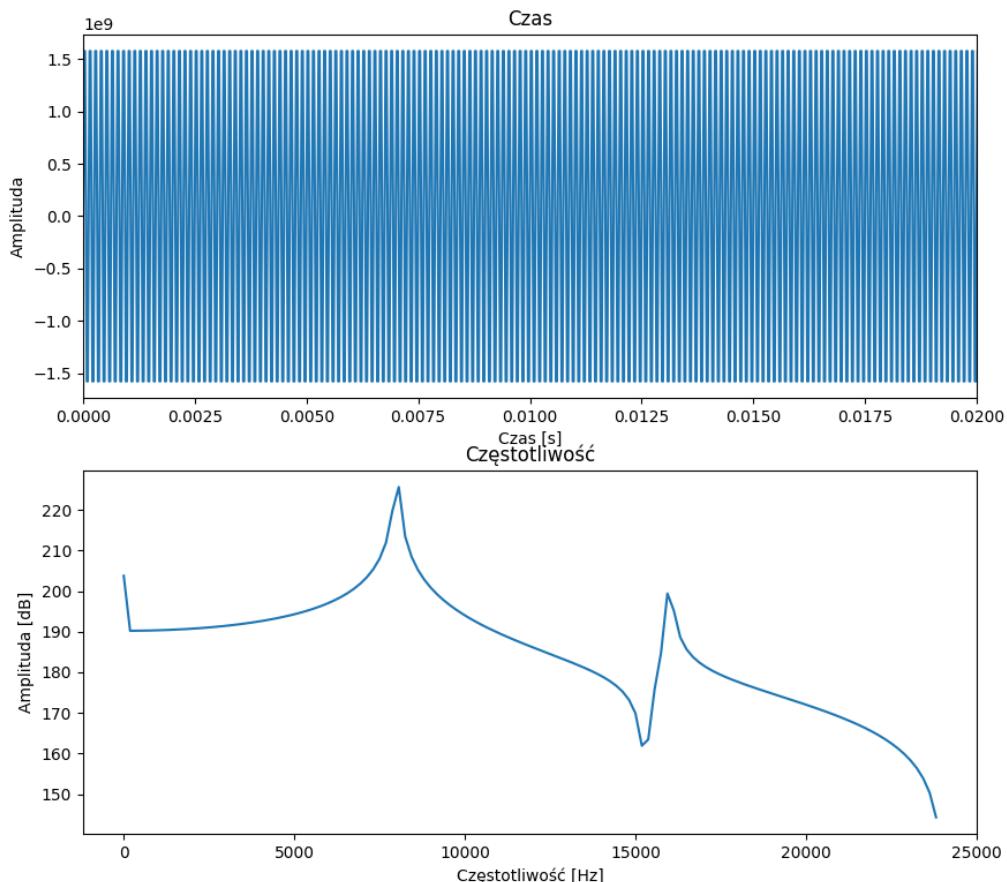
wartość losowa = [0.43695185]

Peak freq = 480.46875

Peak amp = 225.88855938430325

## Plik - SIN/sin\_8000Hz.wav

### Kwantyzacja, Bit 4



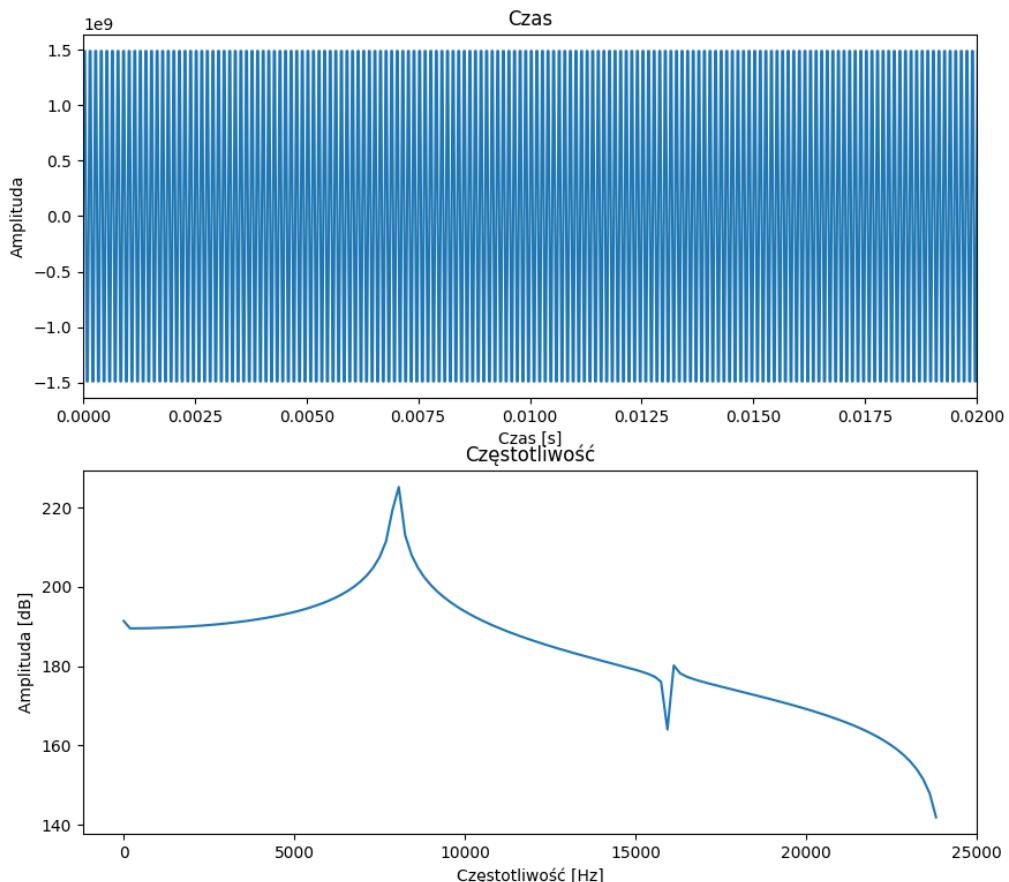
wartość losowa = [0.7466746]

Peak freq = 8062.5

Peak amp = 225.64159993887458

## Plik - SIN/sin\_8000Hz.wav

### Kwantyzacja, Bit 8



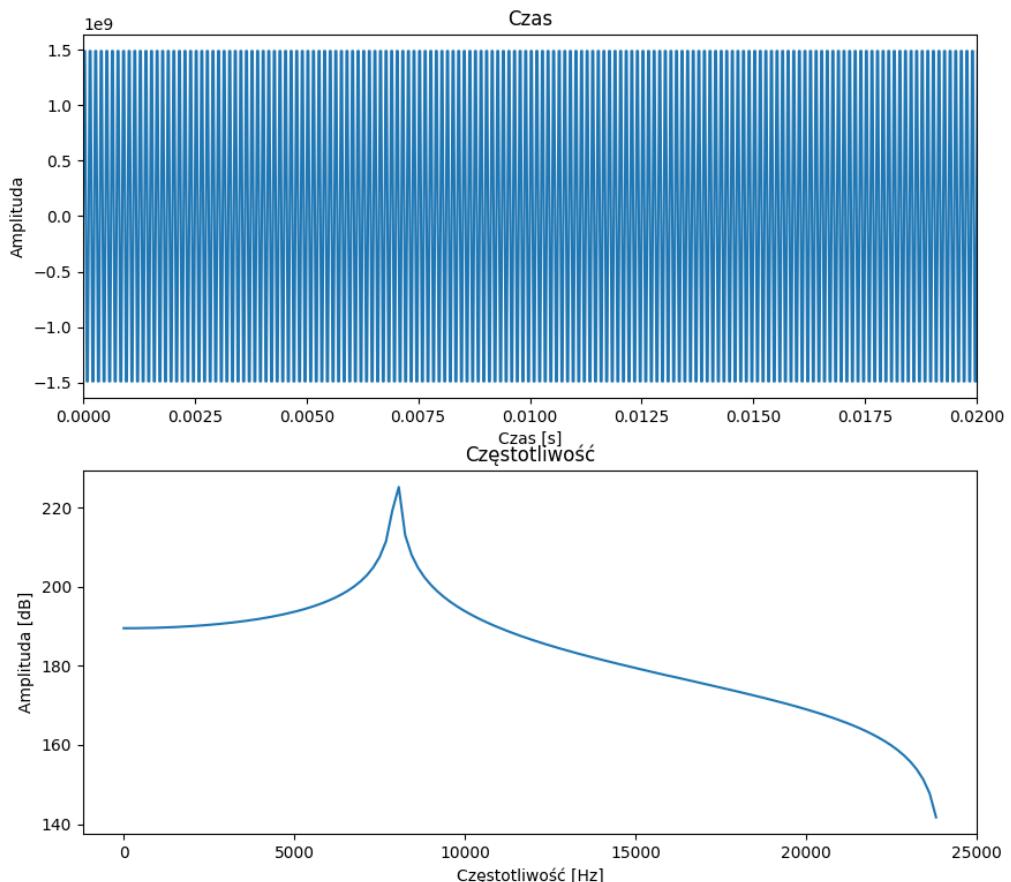
wartość losowa = [0.70801602]

Peak freq = 8062.5

Peak amp = 225.16953185143984

## Plik - SIN/sin\_8000Hz.wav

### Kwantyzacja, Bit 16



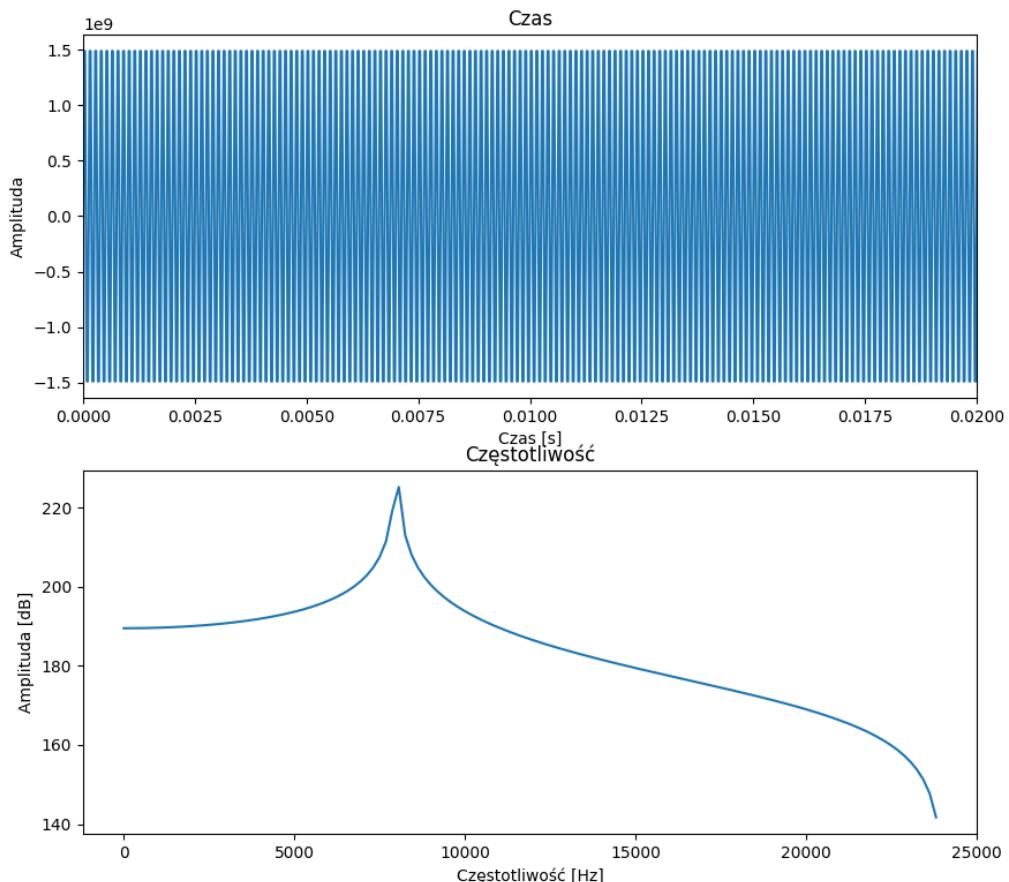
wartość losowa = [0.86980267]

Peak freq = 8062.5

Peak amp = 225.15344469045277

## Plik - SIN/sin\_8000Hz.wav

### Kwantyzacja, Bit 24



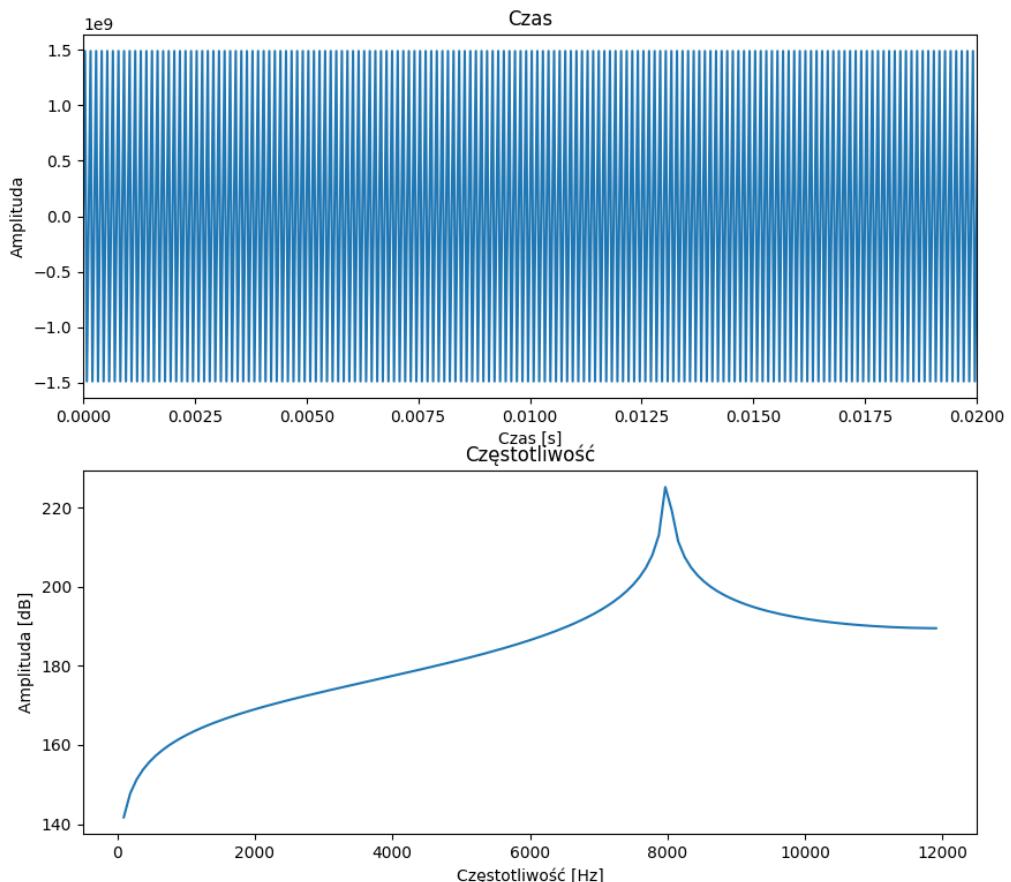
wartość losowa = [0.26868601]

Peak freq = 8062.5

Peak amp = 225.15363311657205

## Plik - SIN/sin\_8000Hz.wav

### Decymacja, N 2



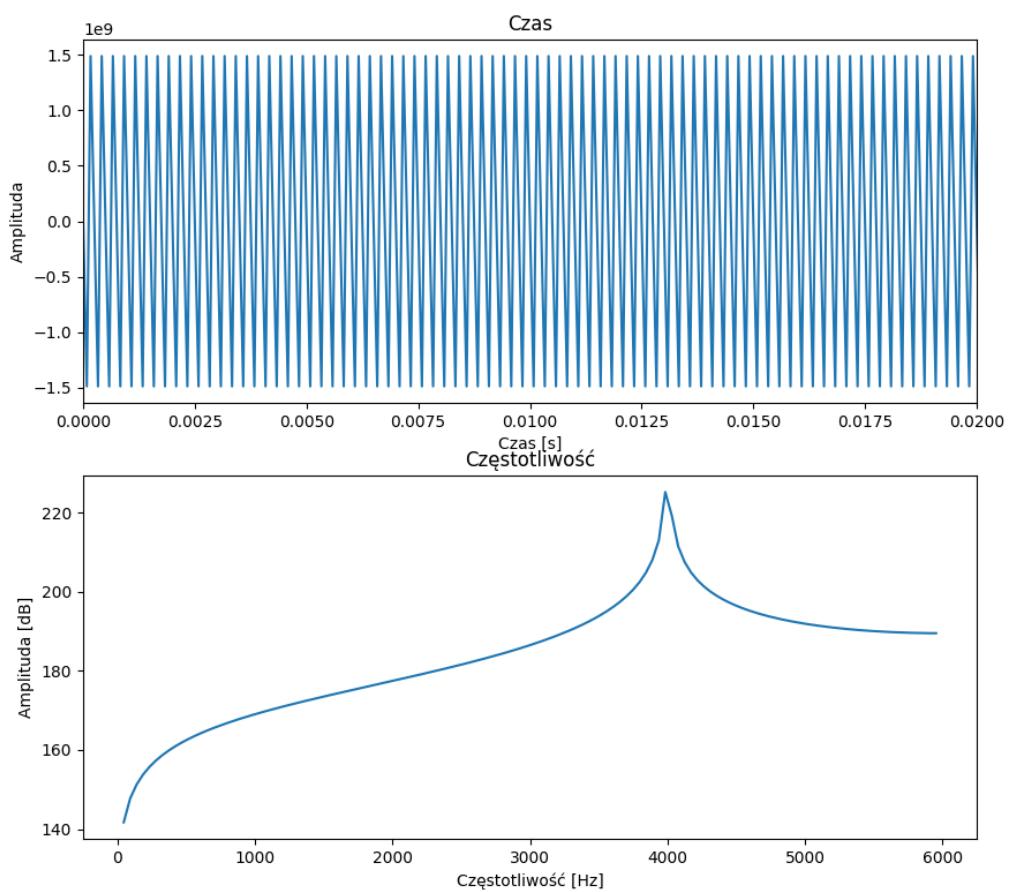
wartość losowa = [0.63483886]

Peak freq = 7968.75

Peak amp = 225.1536333583349

## Plik - SIN/sin\_8000Hz.wav

Decymacja, N 4



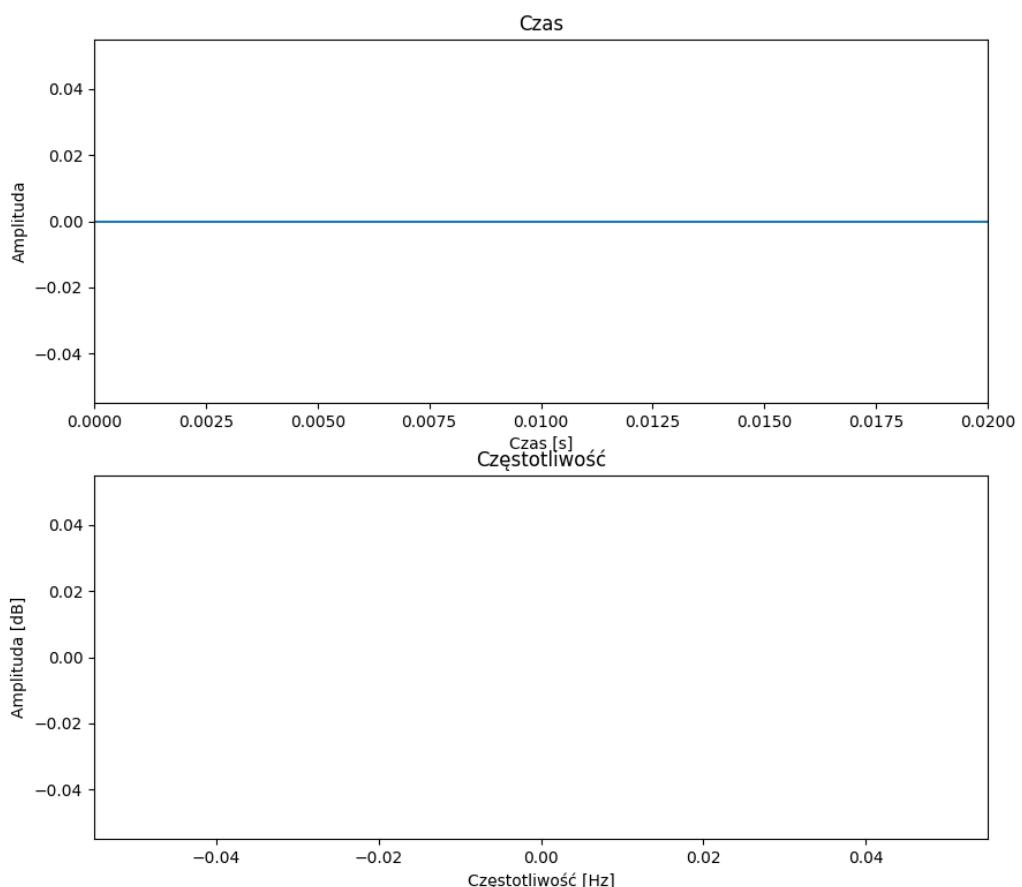
wartość losowa = [0.85478227]

Peak freq = 3984.375

Peak amp = 225.1536333583349

## Plik - SIN/sin\_8000Hz.wav

Decymacja, N 6



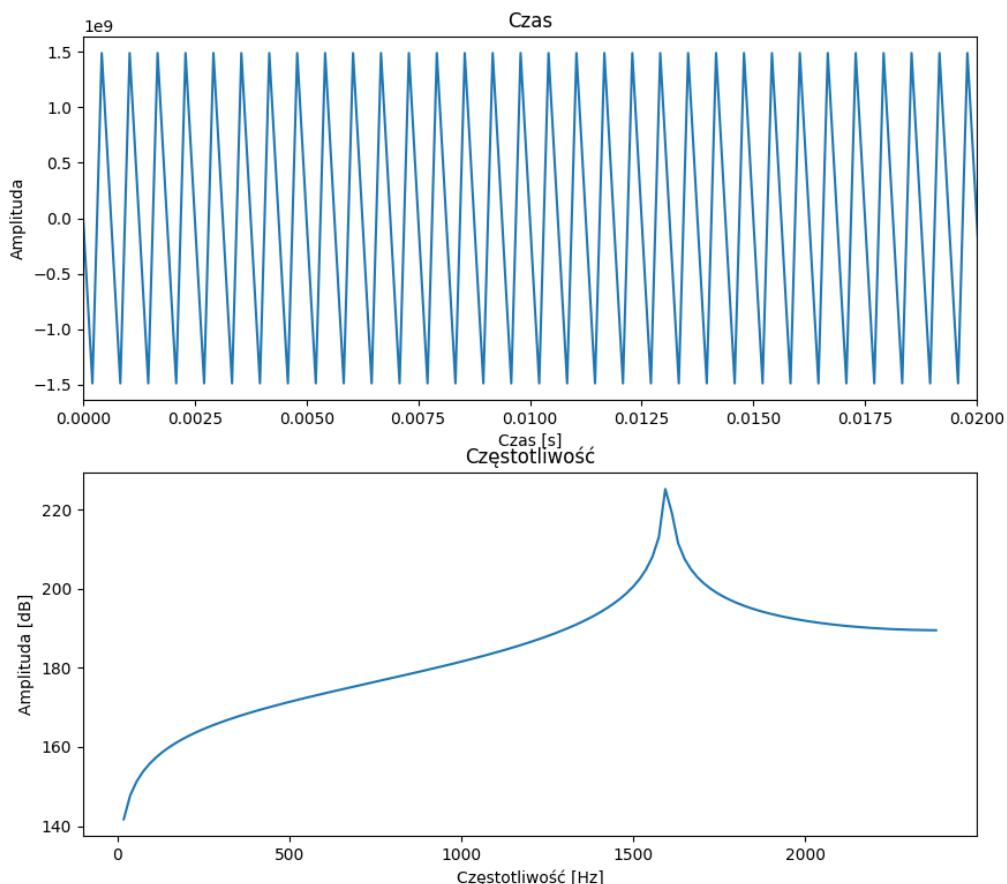
wartość losowa = [0.43893319]

Peak freq = 0.0

Peak amp = -inf

## Plik - SIN/sin\_8000Hz.wav

Decymacja, N 10



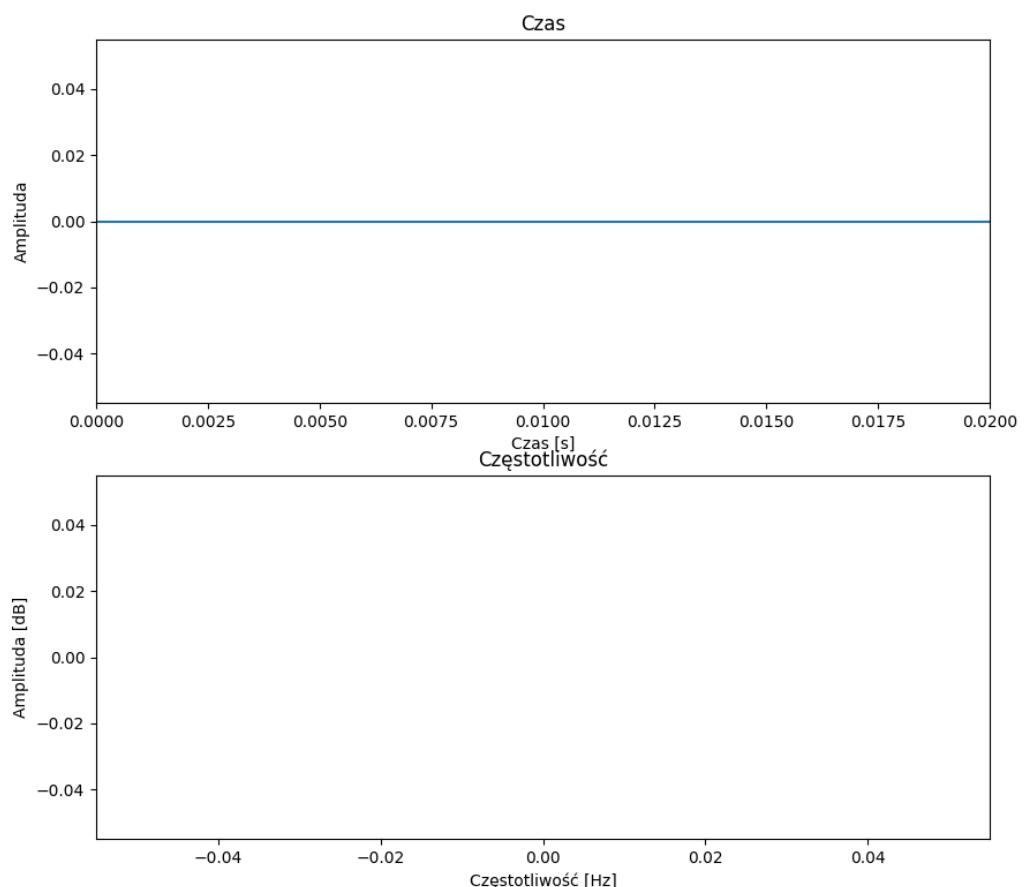
wartość losowa = [0.75122739]

Peak freq = 1593.75

Peak amp = 225.1536333583349

## Plik - SIN/sin\_8000Hz.wav

Decymacja, N 24



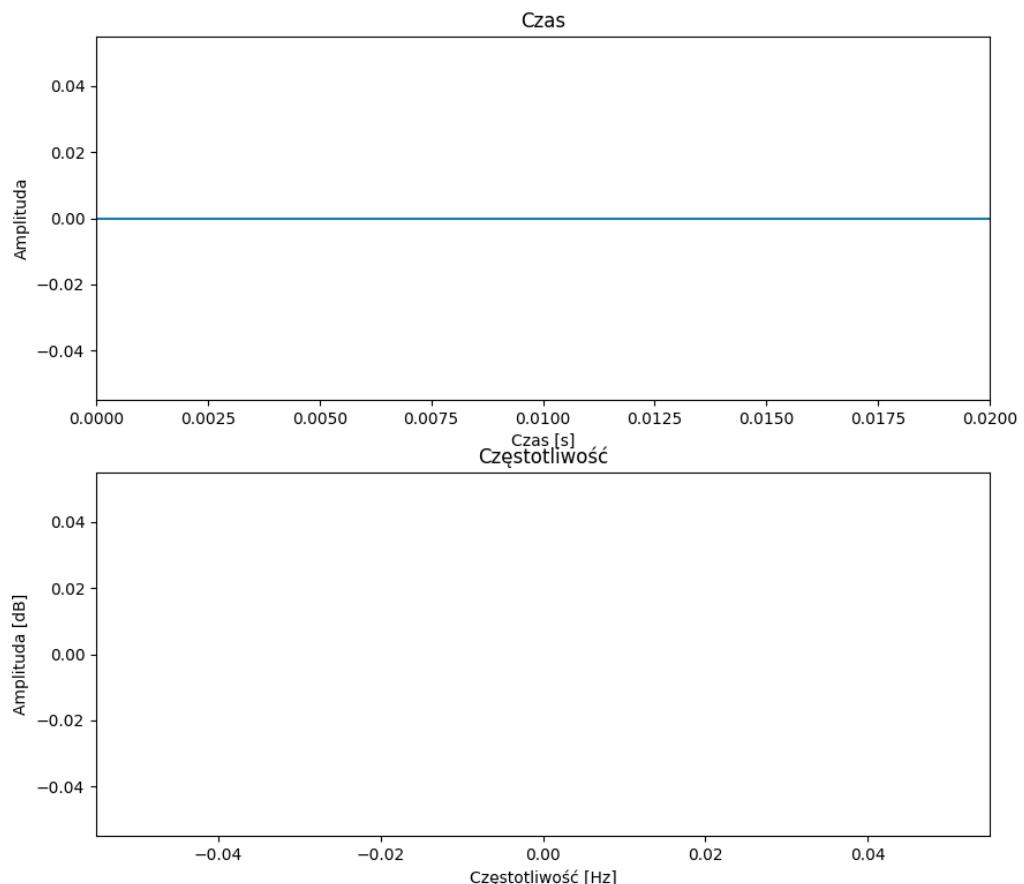
wartość losowa = [0.03552131]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja liniowa, Fs 2000**



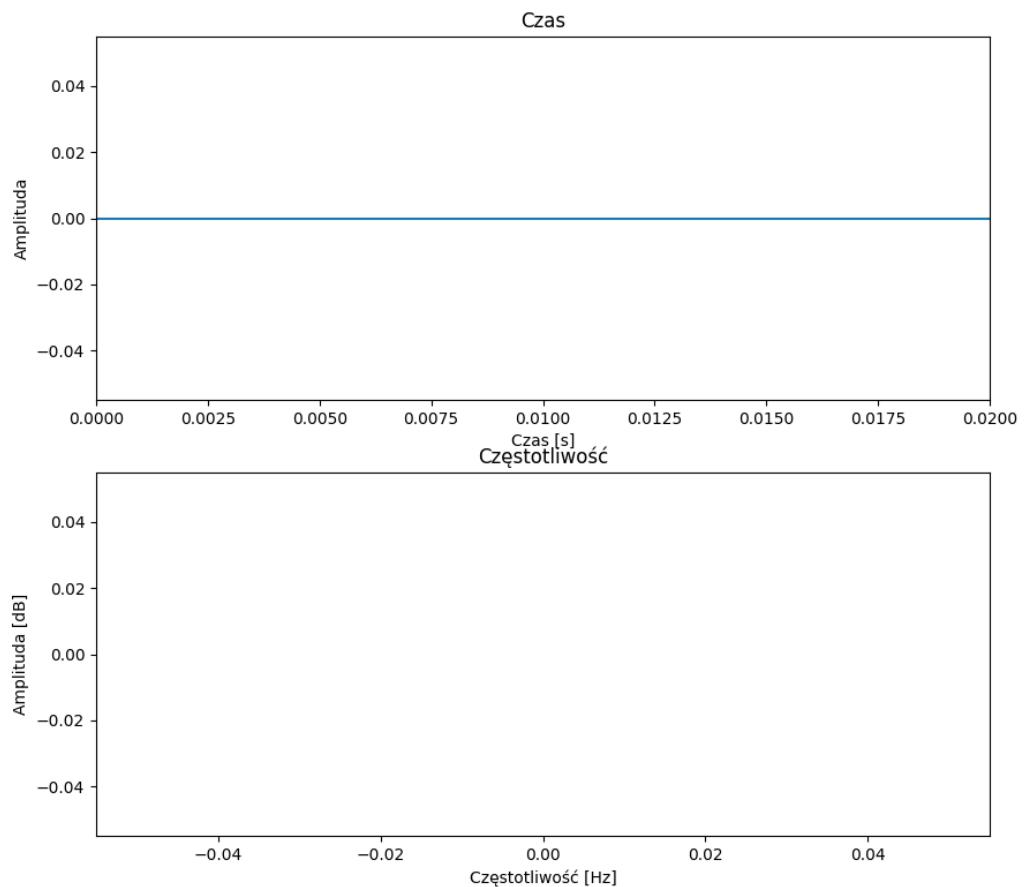
wartość losowa = [0.29069115]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja liniowa, Fs 4000**



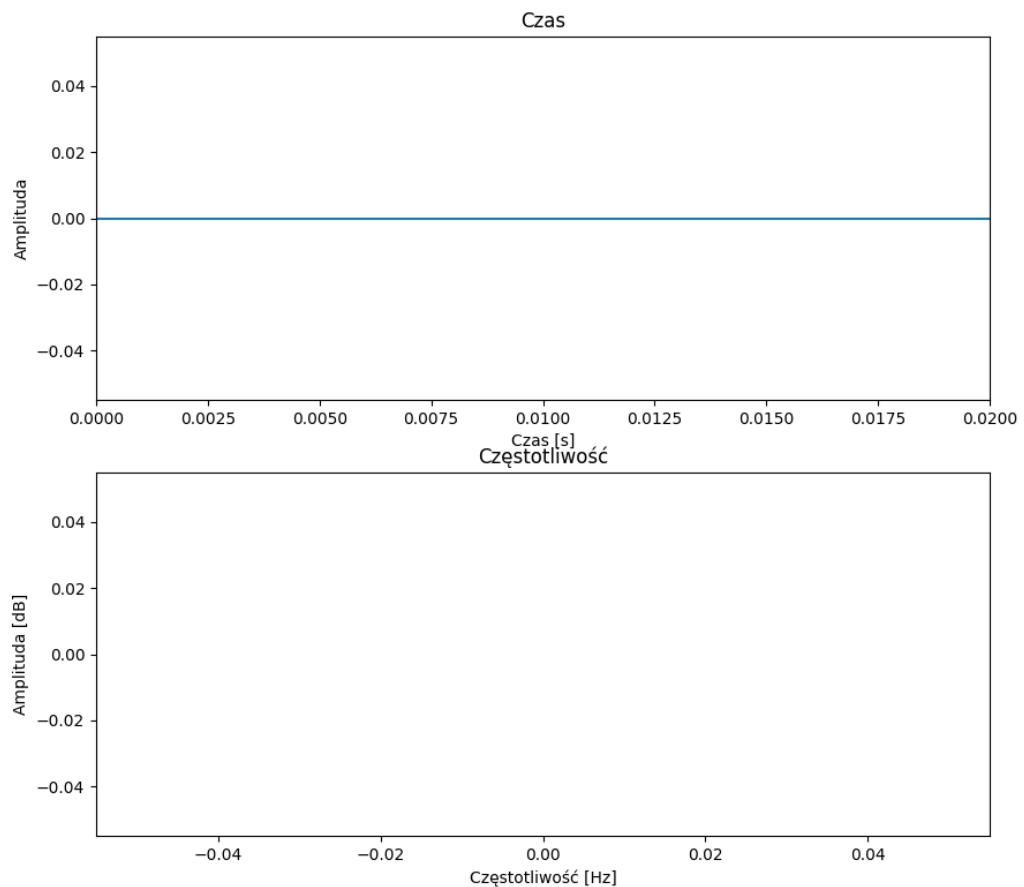
wartość losowa = [0.24876248]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja liniowa, Fs 8000**



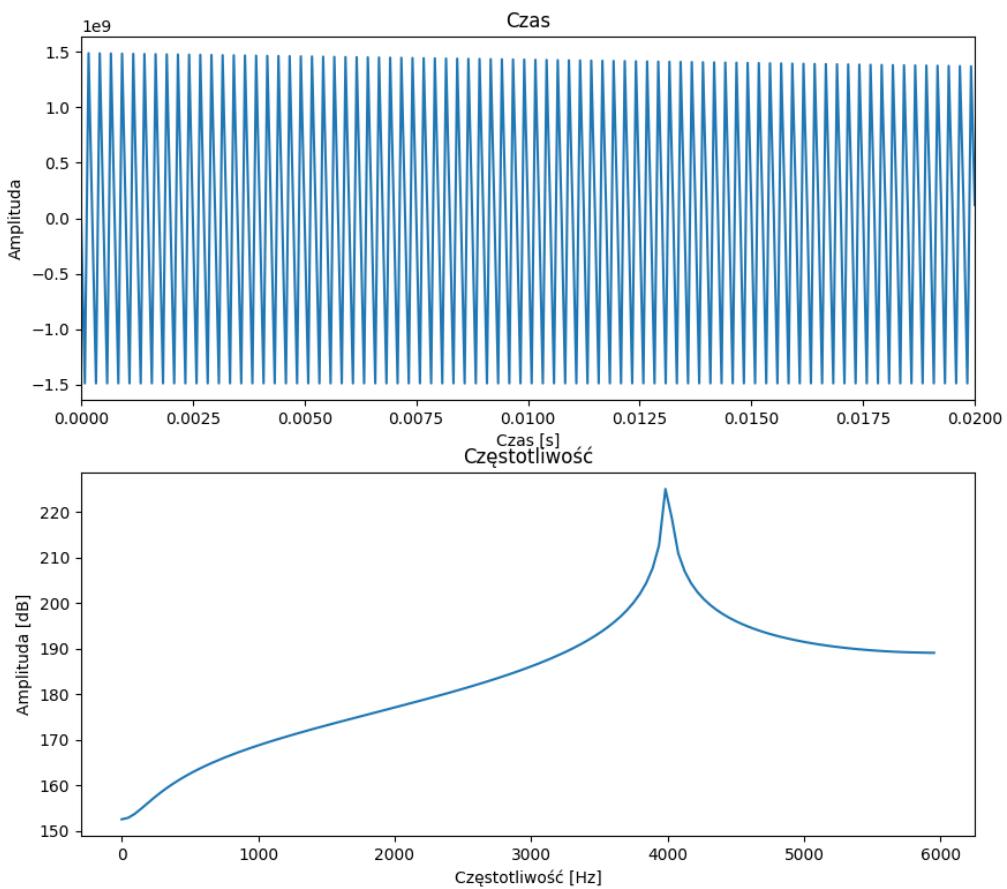
wartość losowa = [0.14191651]

Peak freq = 0.0

Peak amp = -inf

Plik - SIN/sin\_8000Hz.wav

Interpolacja liniowa, Fs 11999



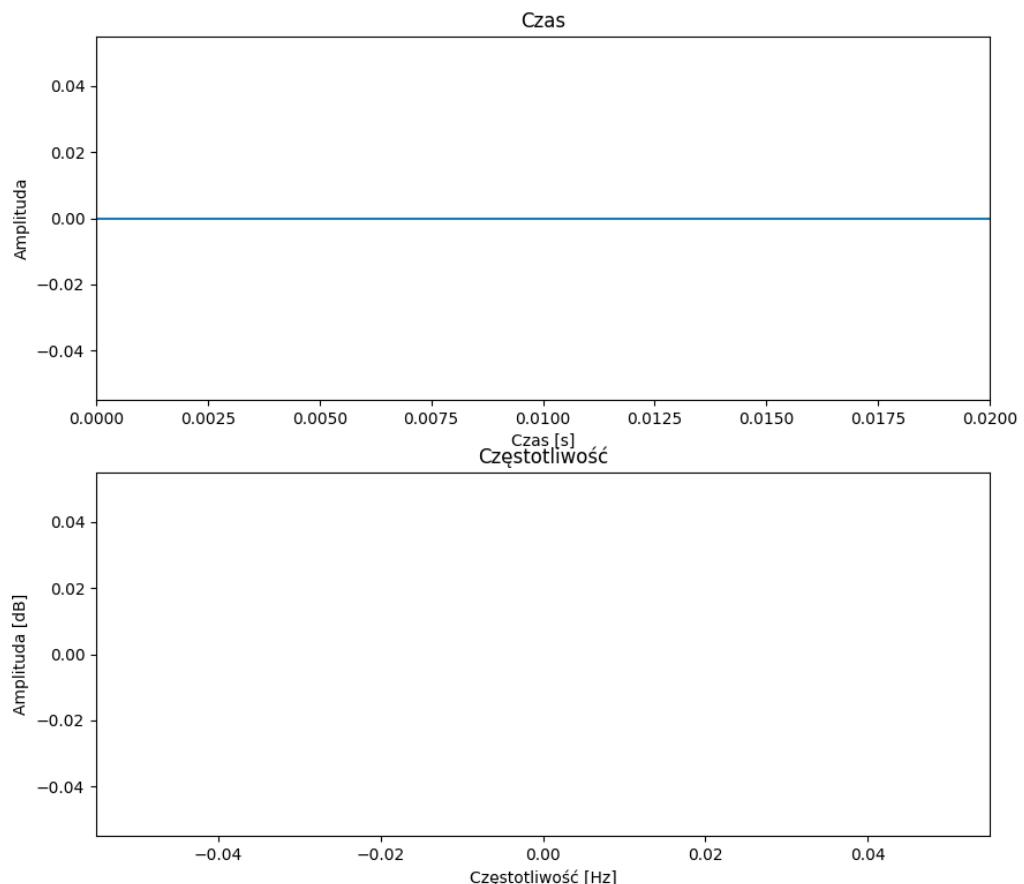
wartość losowa = [0.95001783]

Peak freq = 3984.04296875

Peak amp = 225.10045551819852

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja liniowa, Fs 16000**



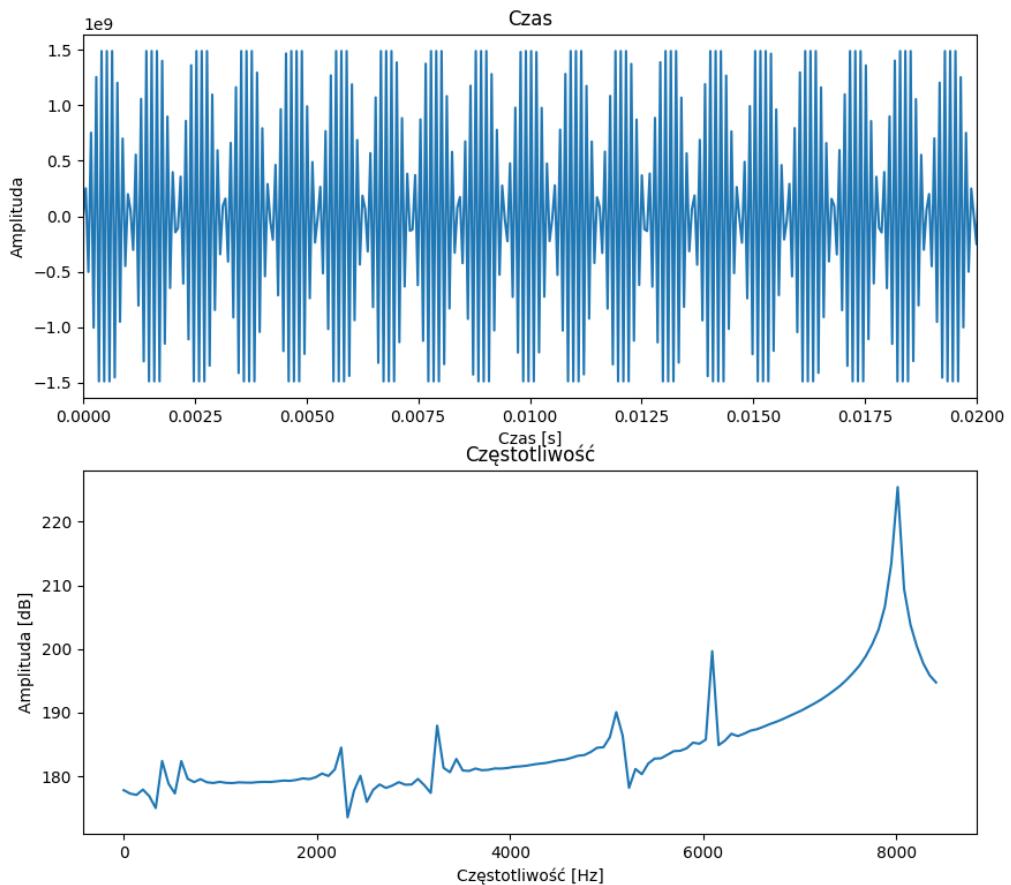
wartość losowa = [0.9633881]

Peak freq = 0.0

Peak amp = -inf

## Plik - SIN/sin\_8000Hz.wav

Interpolacja liniowa, Fs 16953



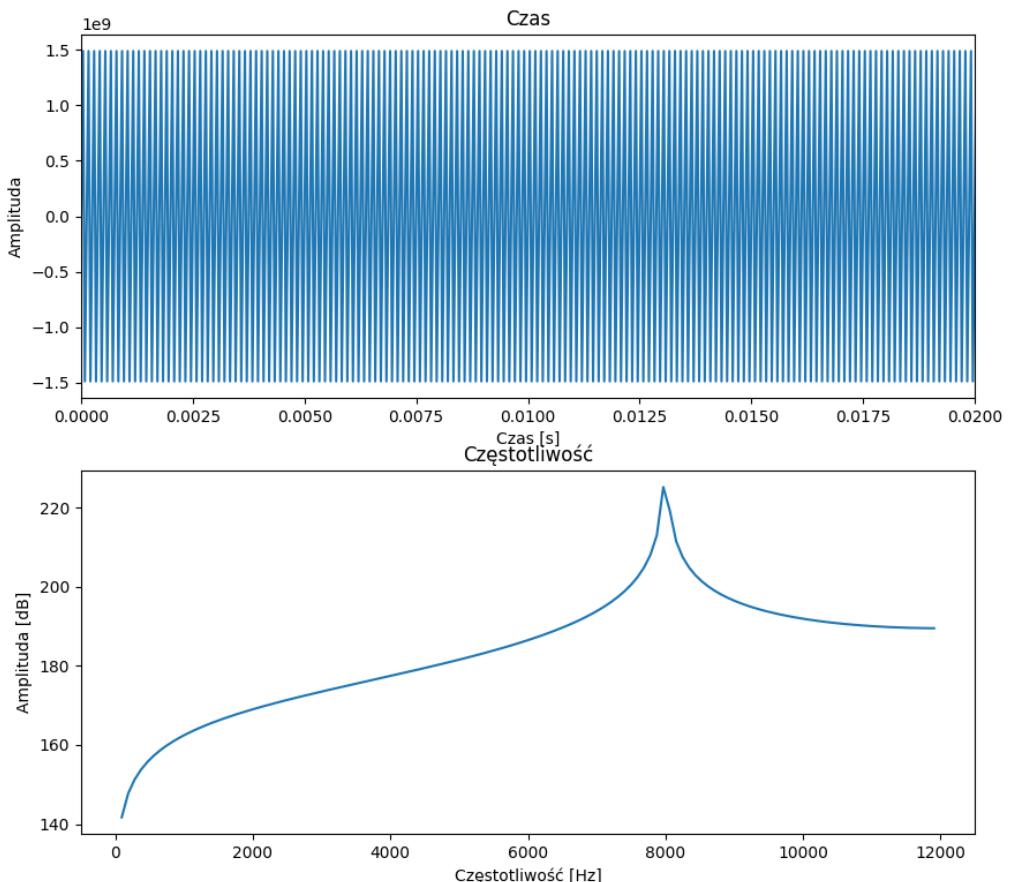
wartość losowa = [0.46796049]

Peak freq = 8012.94140625

Peak amp = 225.4327450198428

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja liniowa, Fs 24000**



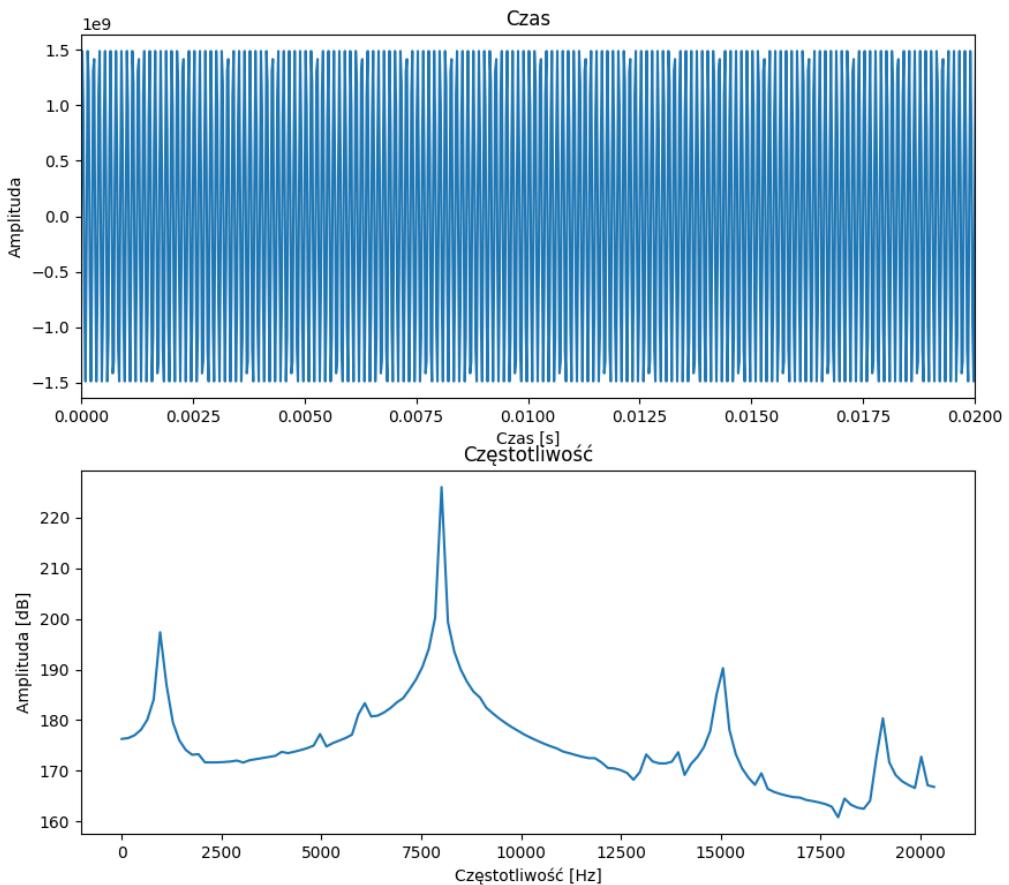
wartość losowa = [0.05435221]

Peak freq = 7968.75

Peak amp = 225.1536333583349

## Plik - SIN/sin\_8000Hz.wav

Interpolacja liniowa, Fs 41000



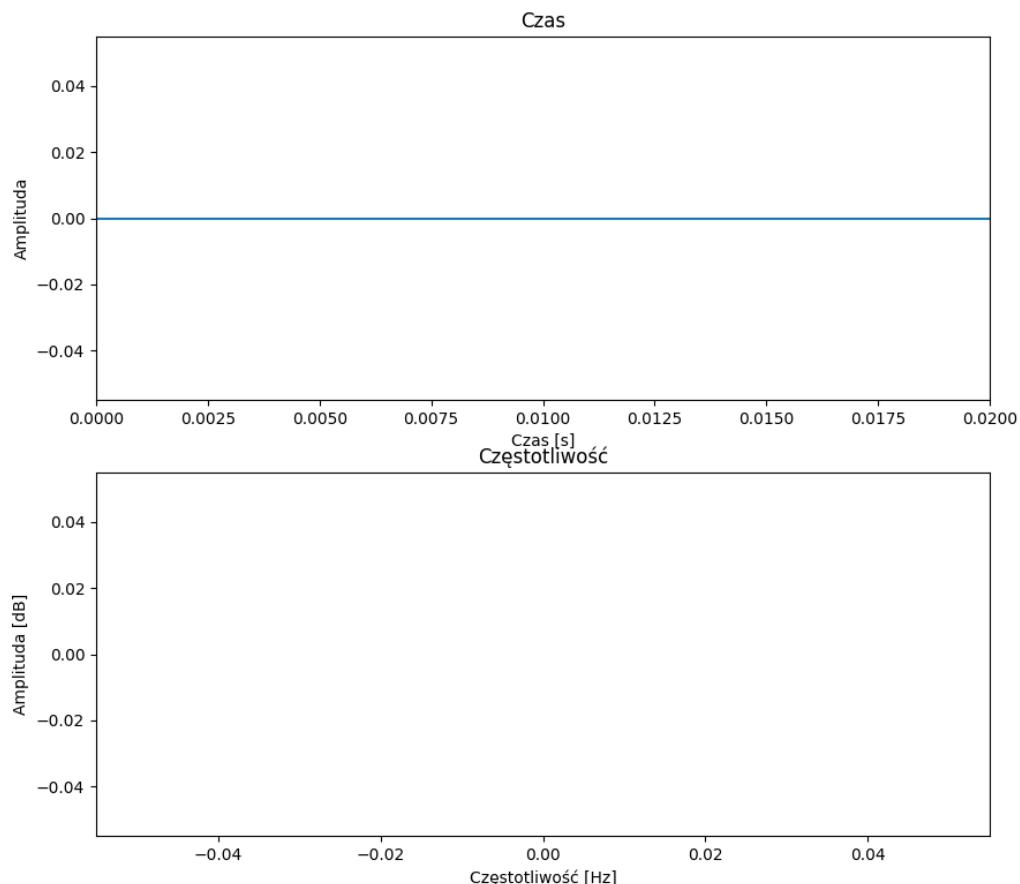
wartość losowa = [0.75107461]

Peak freq = 8007.8125

Peak amp = 226.0062287089305

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 2000**



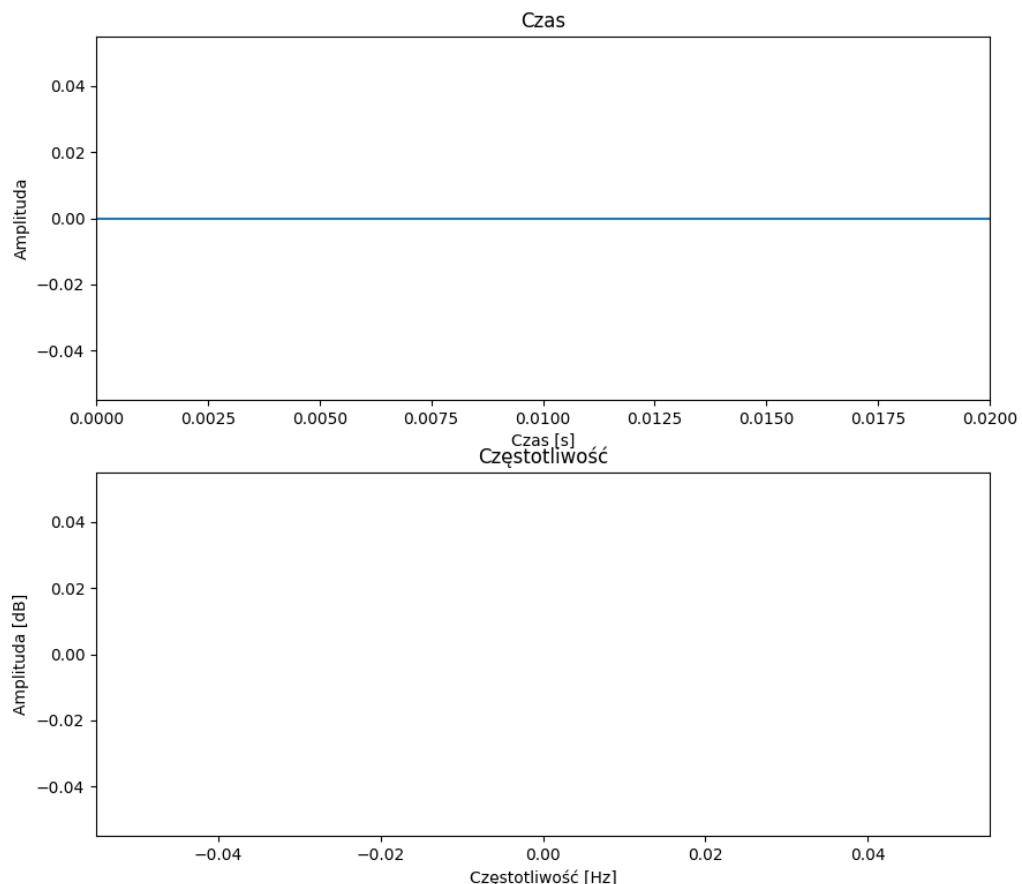
wartość losowa = [0.79682414]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 4000**



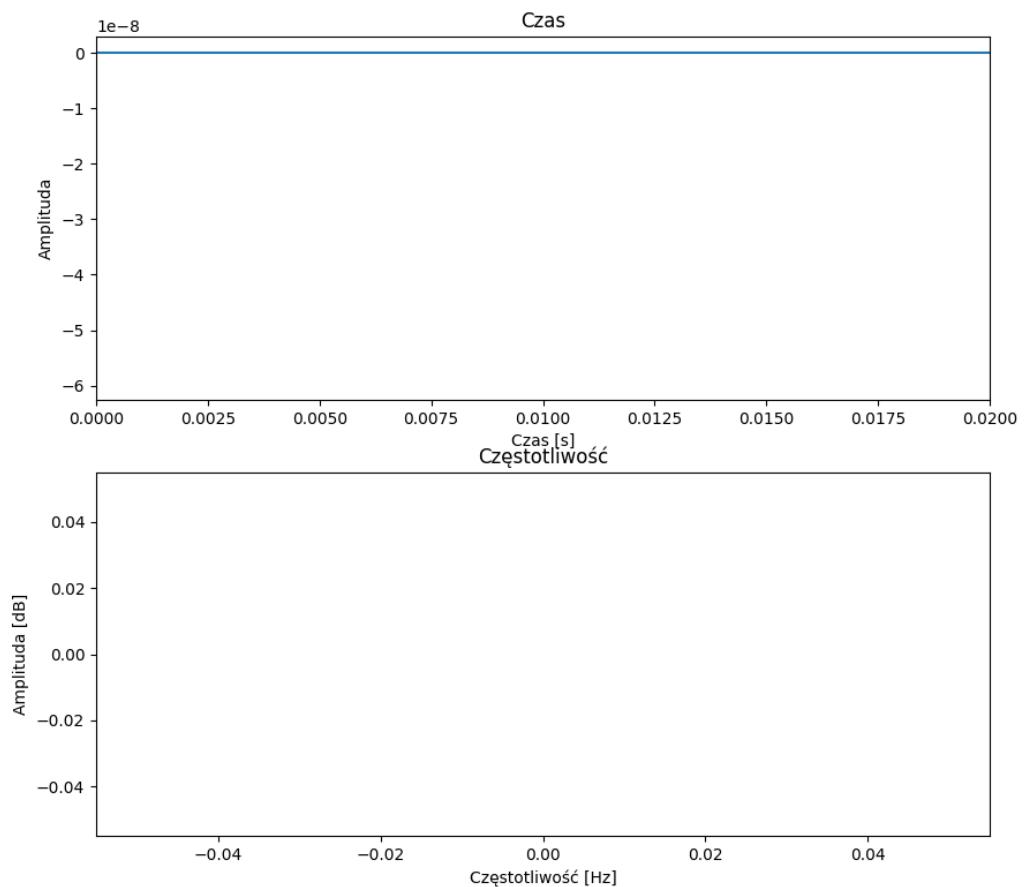
wartość losowa = [0.38077487]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 8000**



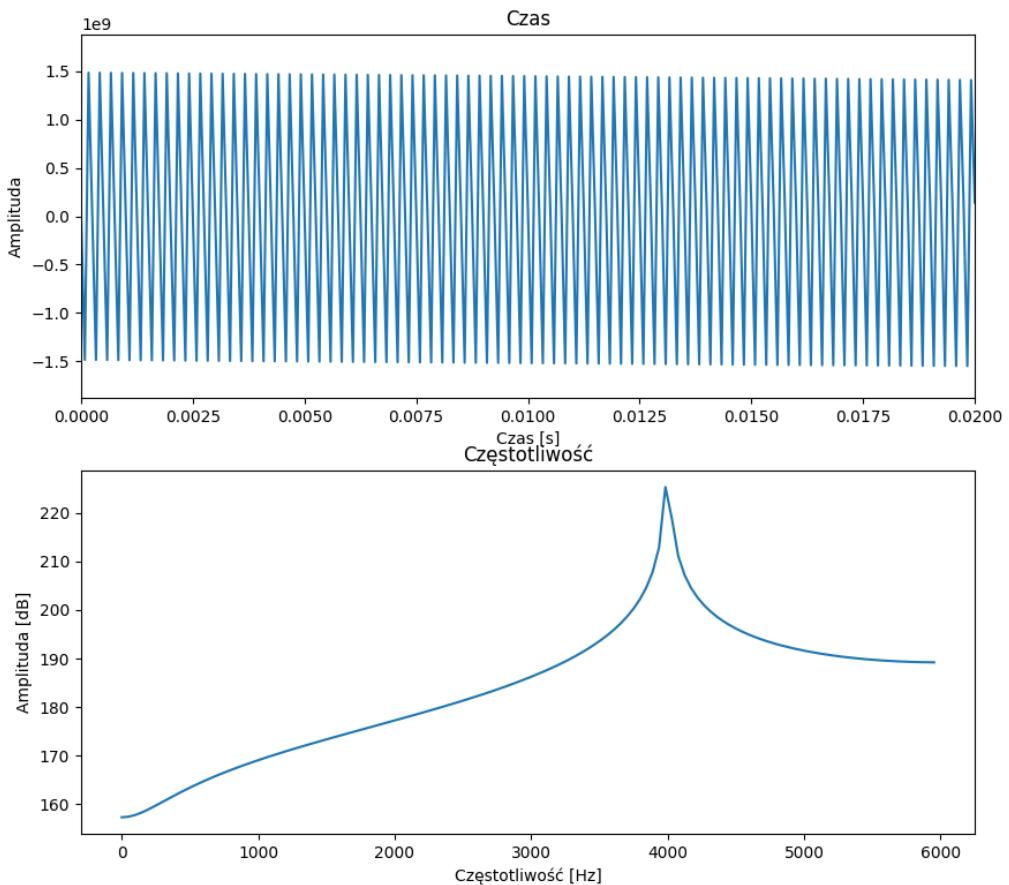
wartość losowa = [0.07097007]

Peak freq = 0.0

Peak amp = -inf

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 11999**



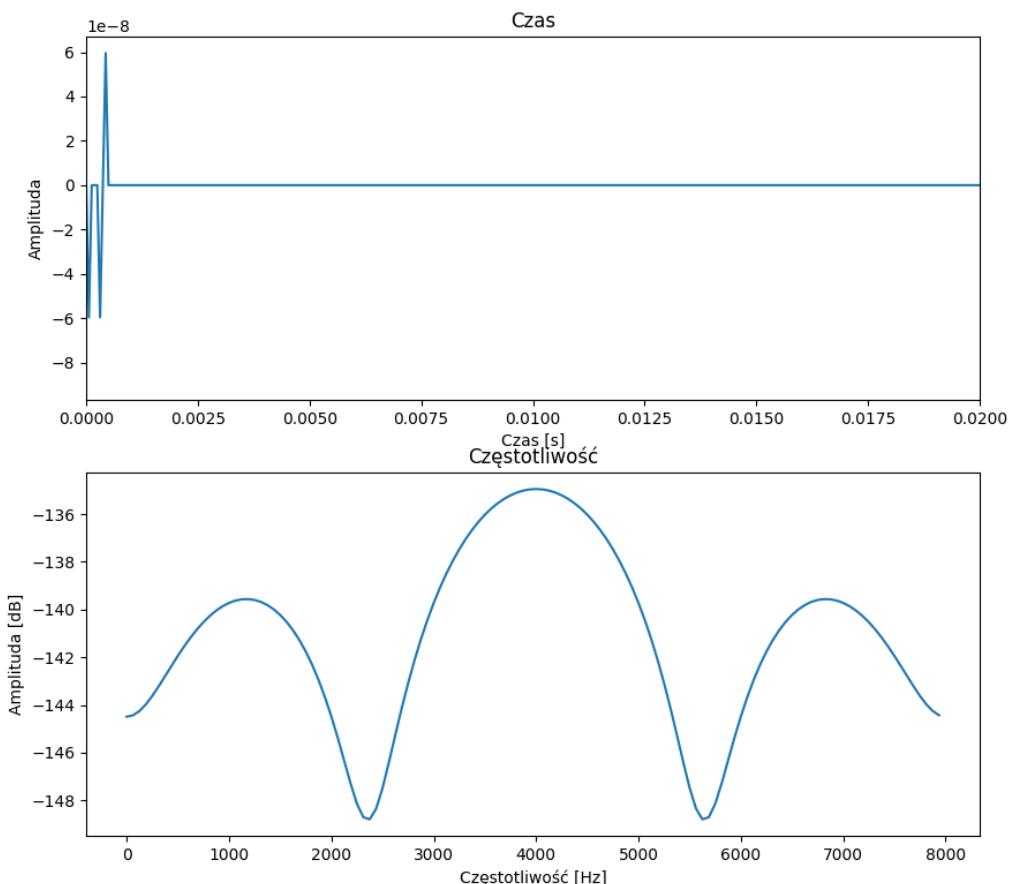
wartość losowa = [0.57219494]

Peak freq = 3984.04296875

Peak amp = 225.2963633470597

## Plik - SIN/sin\_8000Hz.wav

Interpolacja nieliniowa, Fs 16000



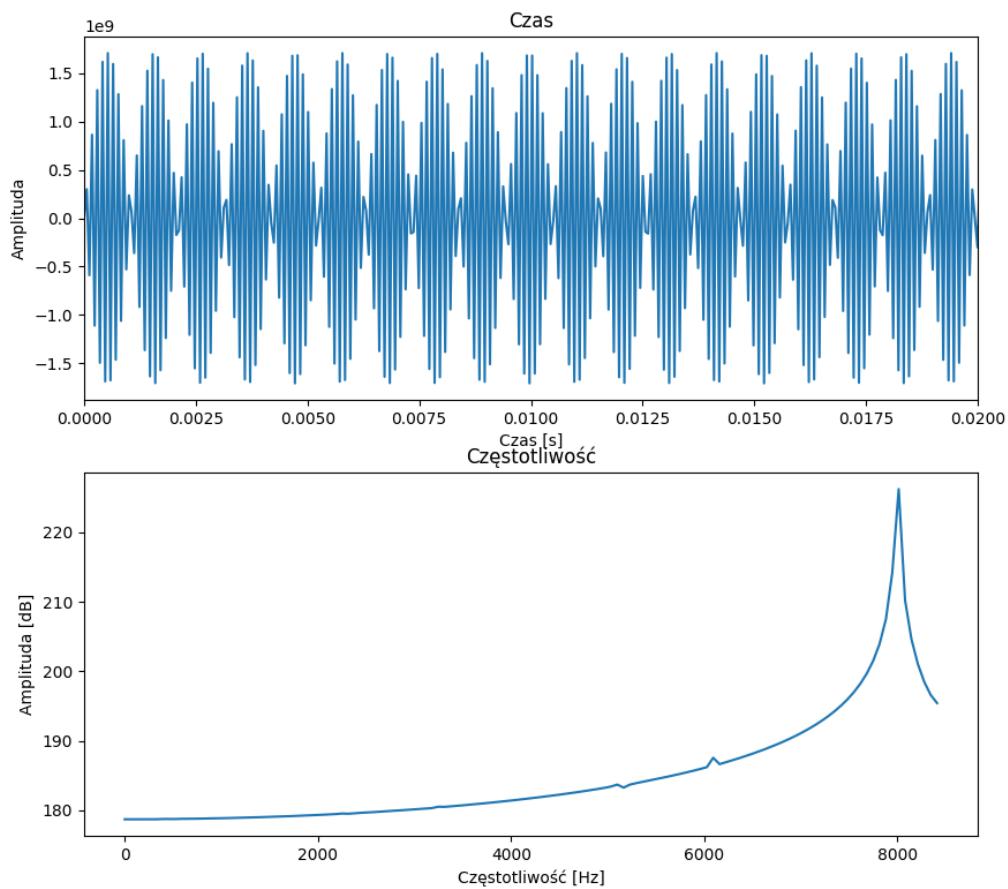
wartość losowa = [0.86969928]

Peak freq = 4000.0

Peak amp = -134.95197270510843

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 16953**



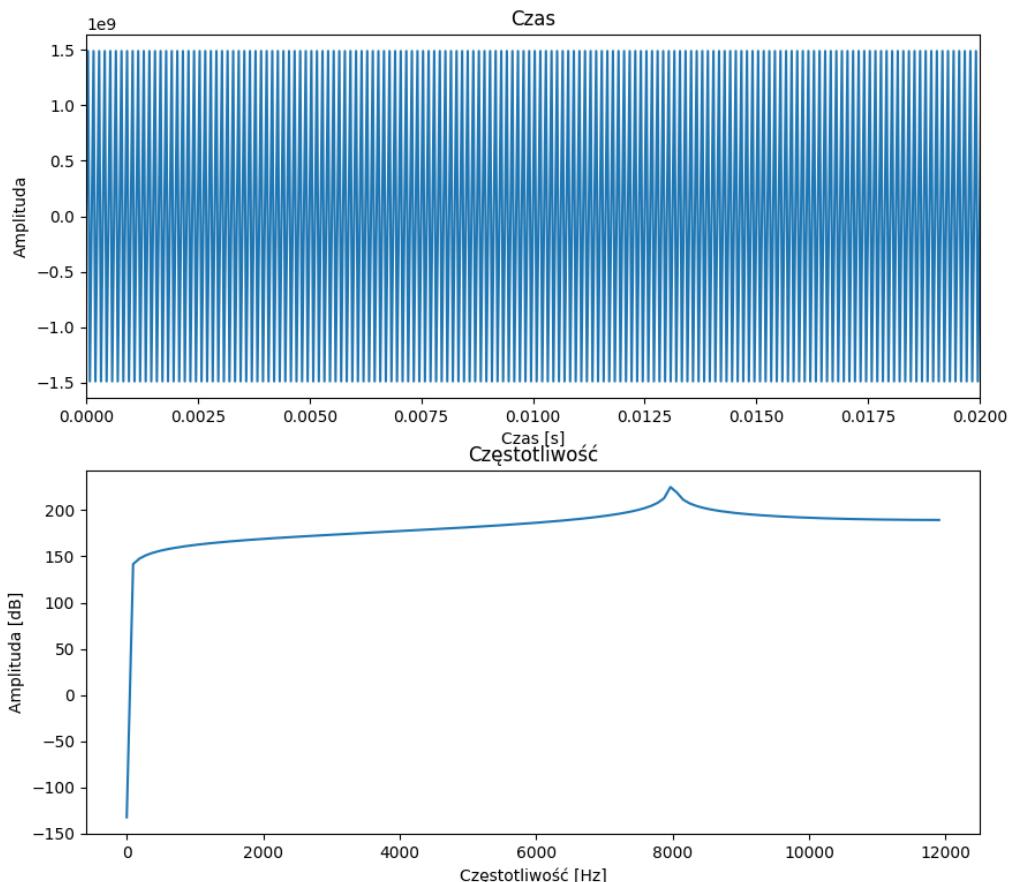
wartość losowa = [0.54230502]

Peak freq = 8012.94140625

Peak amp = 226.21408772829568

**Plik - SIN/sin\_8000Hz.wav**

**Interpolacja nieliniowa, Fs 24000**



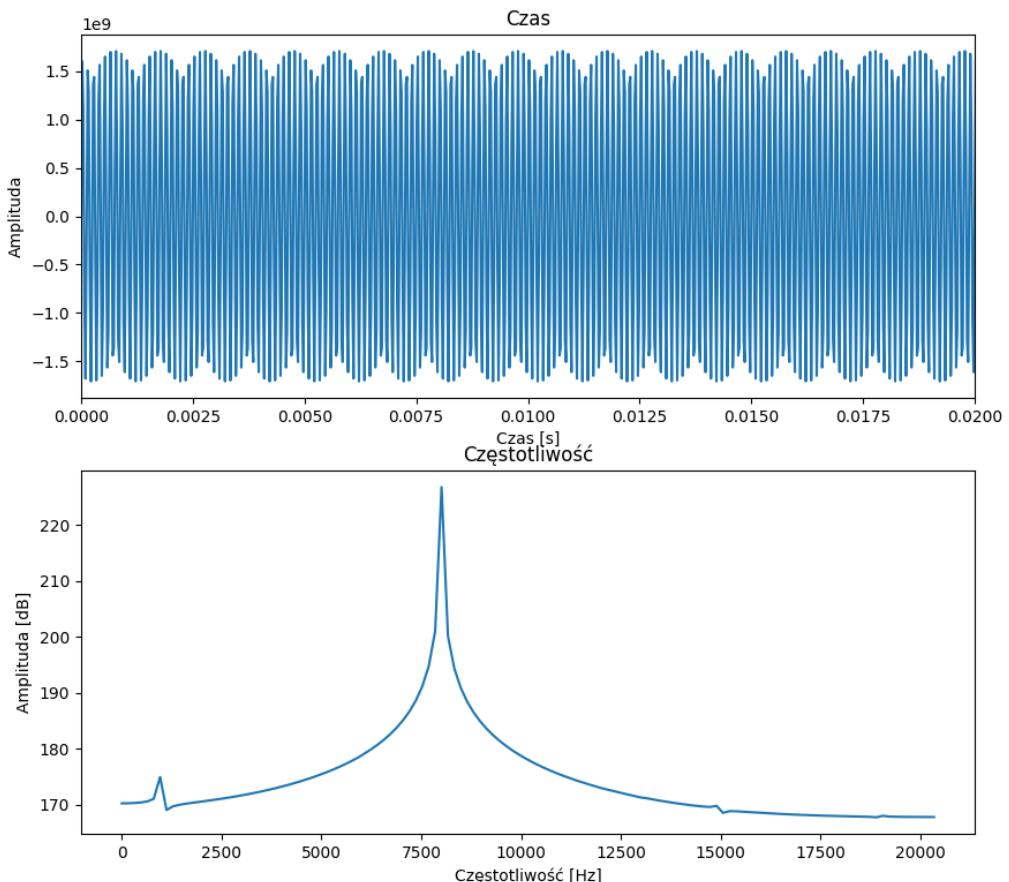
wartość losowa = [0.64988823]

Peak freq = 7968.75

Peak amp = 225.1536333583349

## Plik - SIN/sin\_8000Hz.wav

Interpolacja nieliniowa, Fs 41000



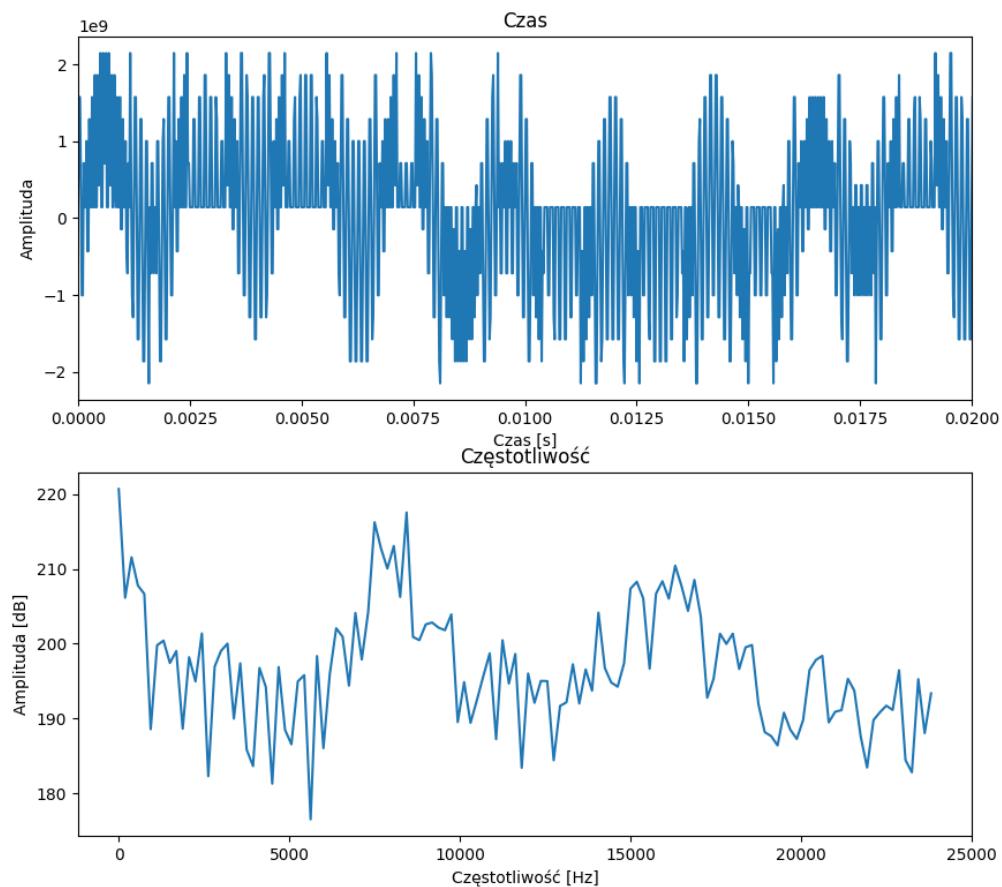
wartość losowa = [0.89042155]

Peak freq = 8007.8125

Peak amp = 226.79178887907096

## Plik - SIN/sin\_combined.wav

### Kwantyzacja, Bit 4



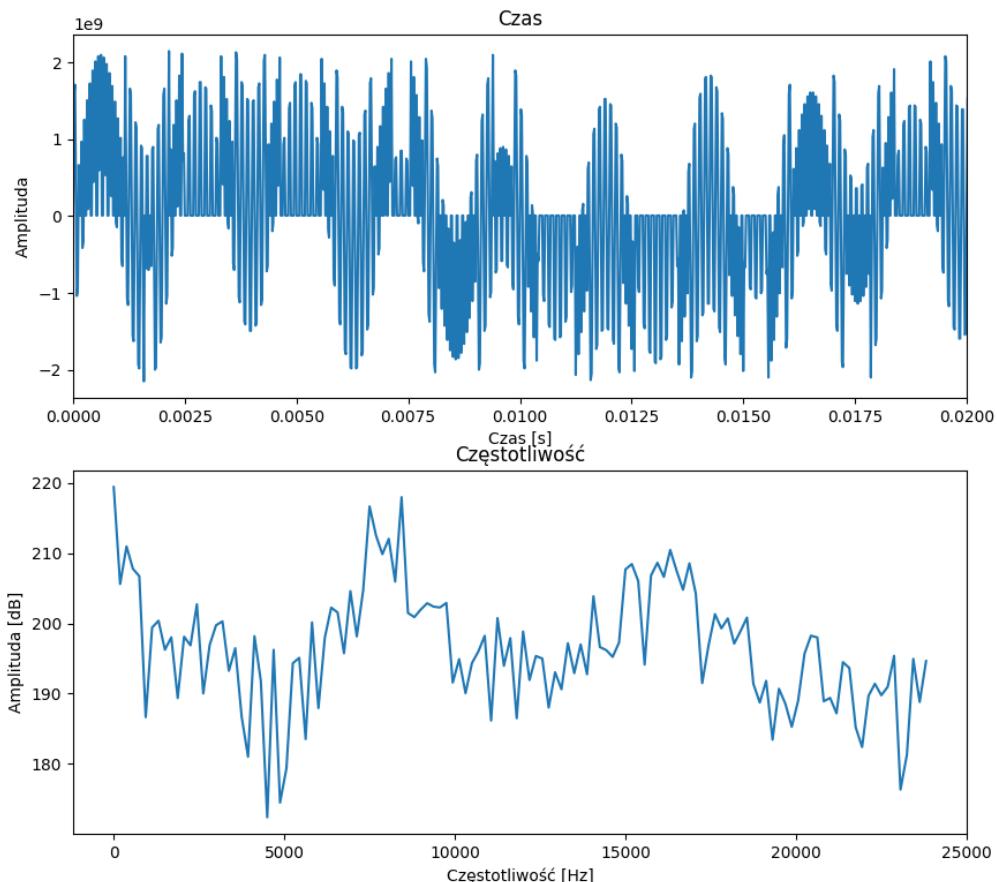
wartość losowa = [0.03839513]

Peak freq = 0.0

Peak amp = 220.6872081474936

## Plik - SIN/sin\_combined.wav

### Kwantyzacja, Bit 8



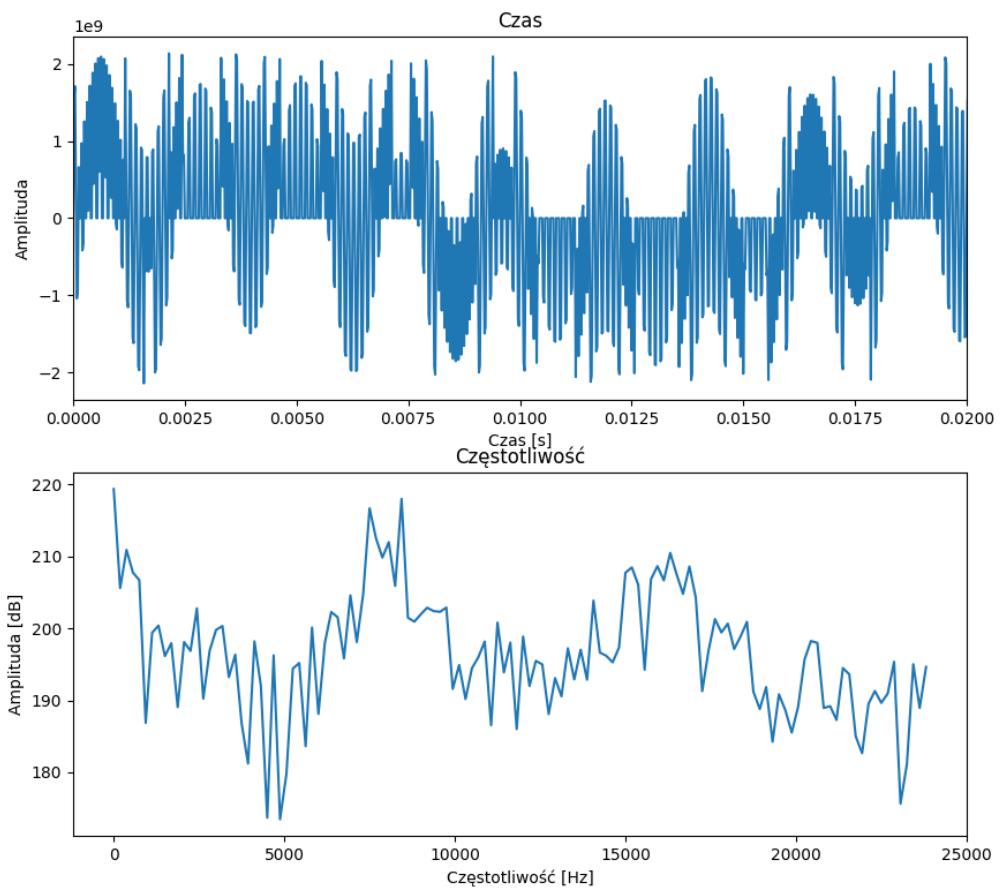
wartość losowa = [0.14044438]

Peak freq = 0.0

Peak amp = 219.41581826820163

## Plik - SIN/sin\_combined.wav

### Kwantyzacja, Bit 16



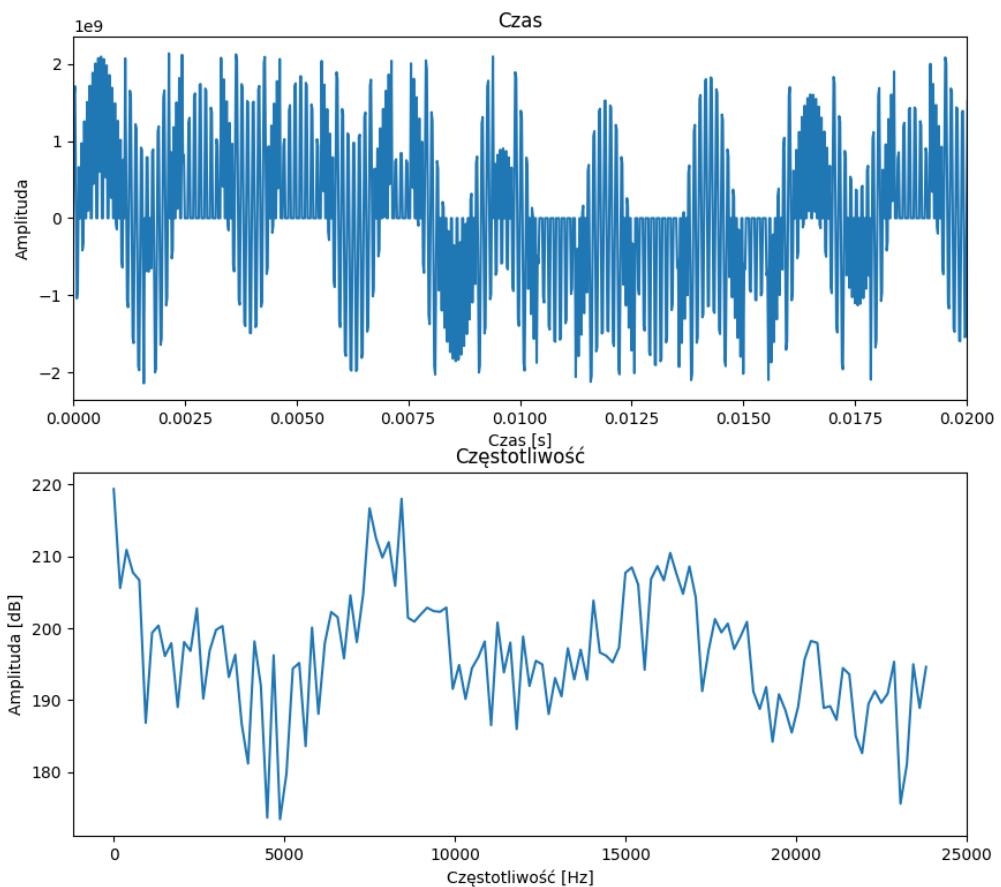
wartość losowa = [0.51983726]

Peak freq = 0.0

Peak amp = 219.3489902386456

## Plik - SIN/sin\_combined.wav

Kwantyzacja, Bit 24



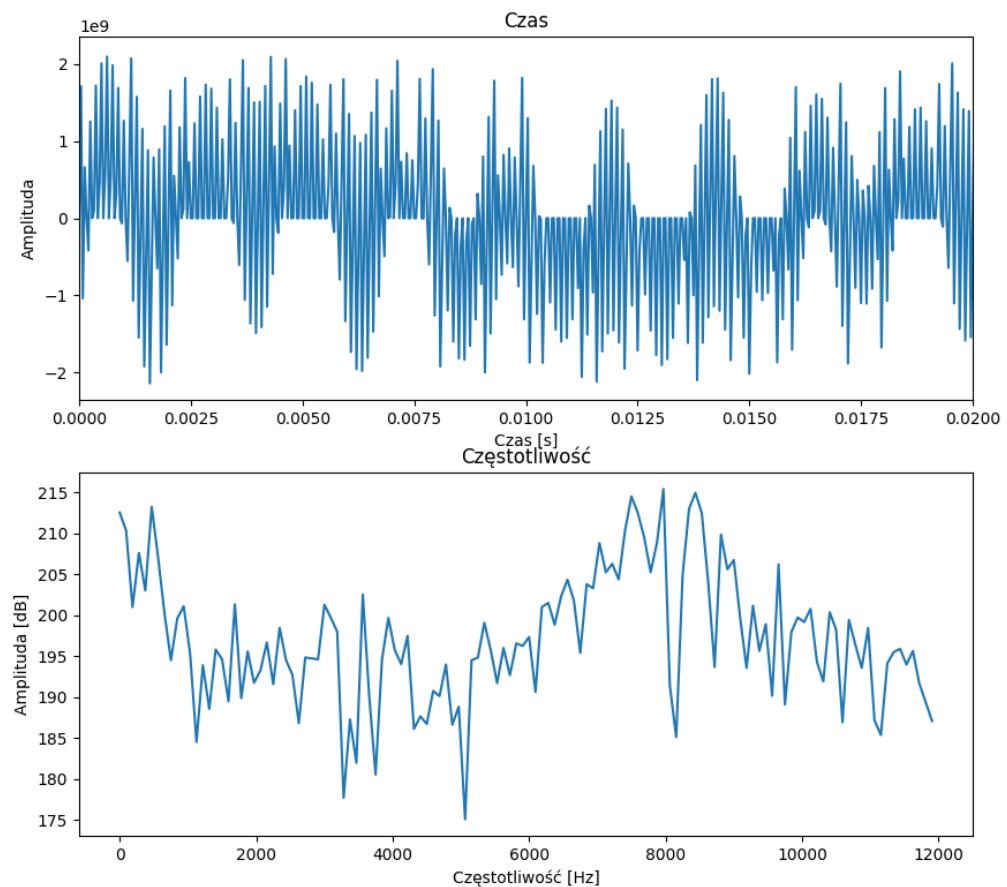
wartość losowa = [0.18616617]

Peak freq = 0.0

Peak amp = 219.34876311041296

## Plik - SIN/sin\_combined.wav

Decymacja, N 2



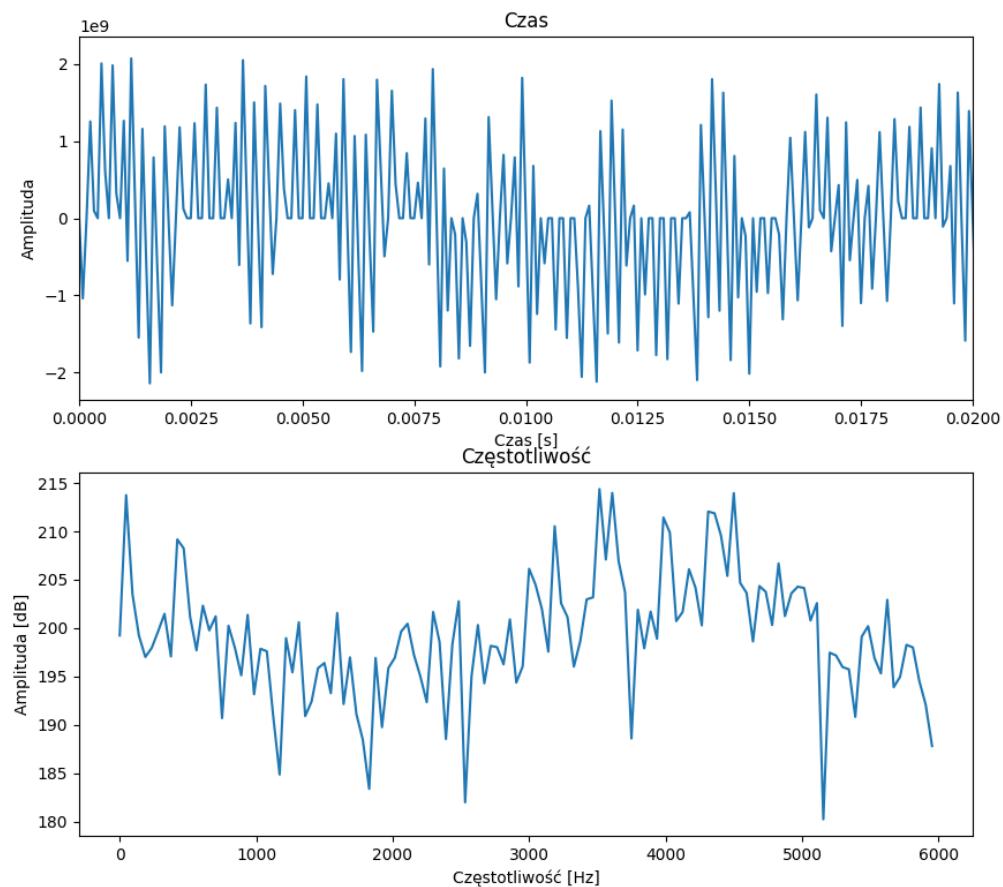
wartość losowa = [0.5369034]

Peak freq = 7968.75

Peak amp = 215.40030228021791

## Plik - SIN/sin\_combined.wav

Decymacja, N 4



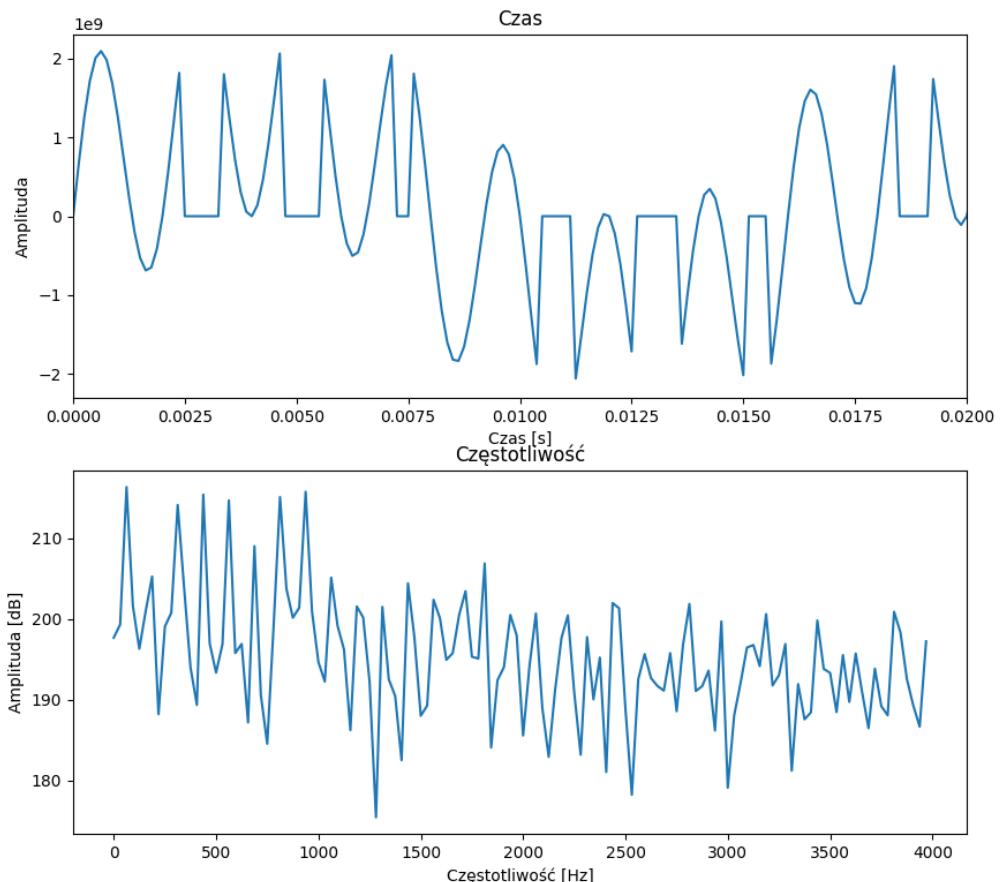
wartość losowa = [0.77920327]

Peak freq = 3515.625

Peak amp = 214.3744721467612

## Plik - SIN/sin\_combined.wav

Decymacja, N 6



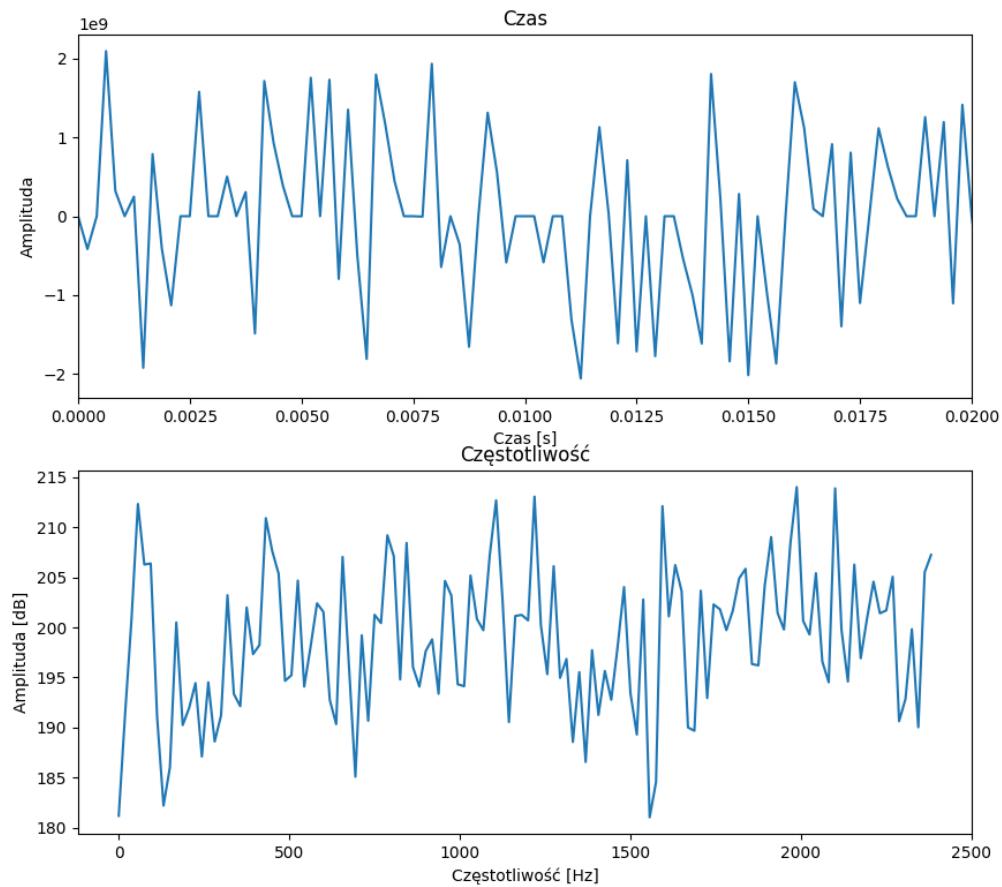
wartość losowa = [0.54045023]

Peak freq = 62.5

Peak amp = 216.33906327560518

## Plik - SIN/sin\_combined.wav

Decymacja, N 10



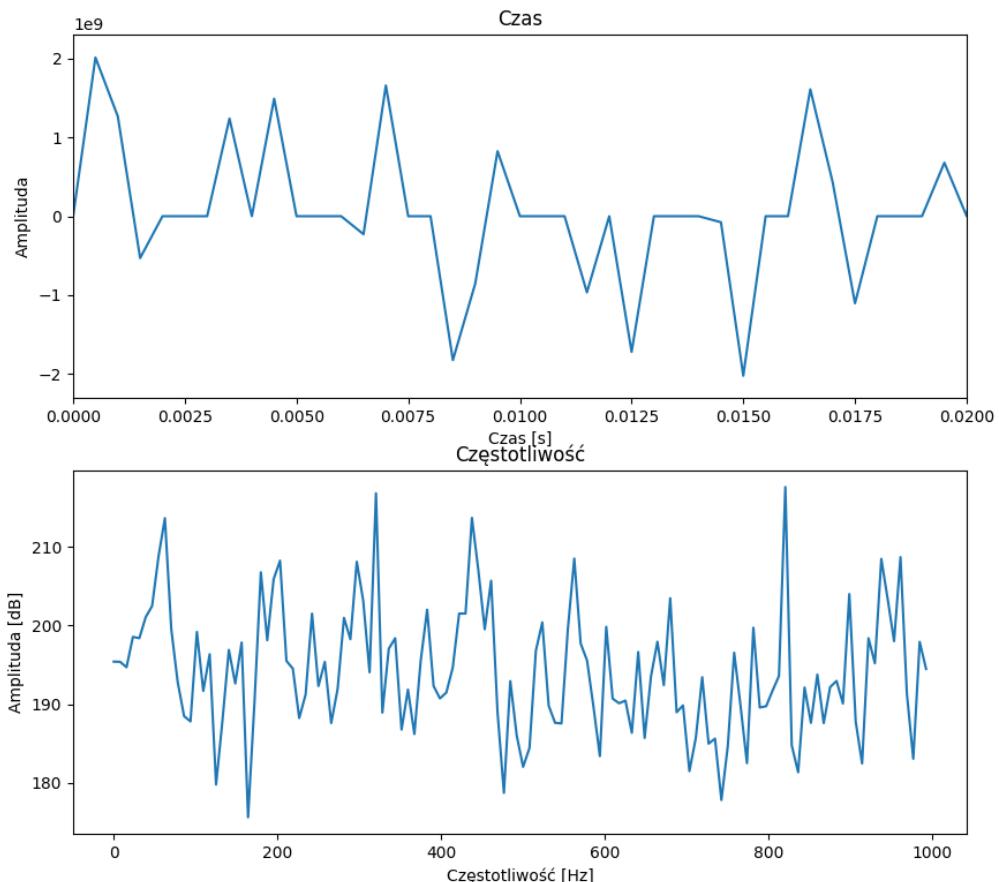
wartość losowa = [0.29335003]

Peak freq = 1987.5

Peak amp = 214.01537543980447

## Plik - SIN/sin\_combined.wav

Decymacja, N 24



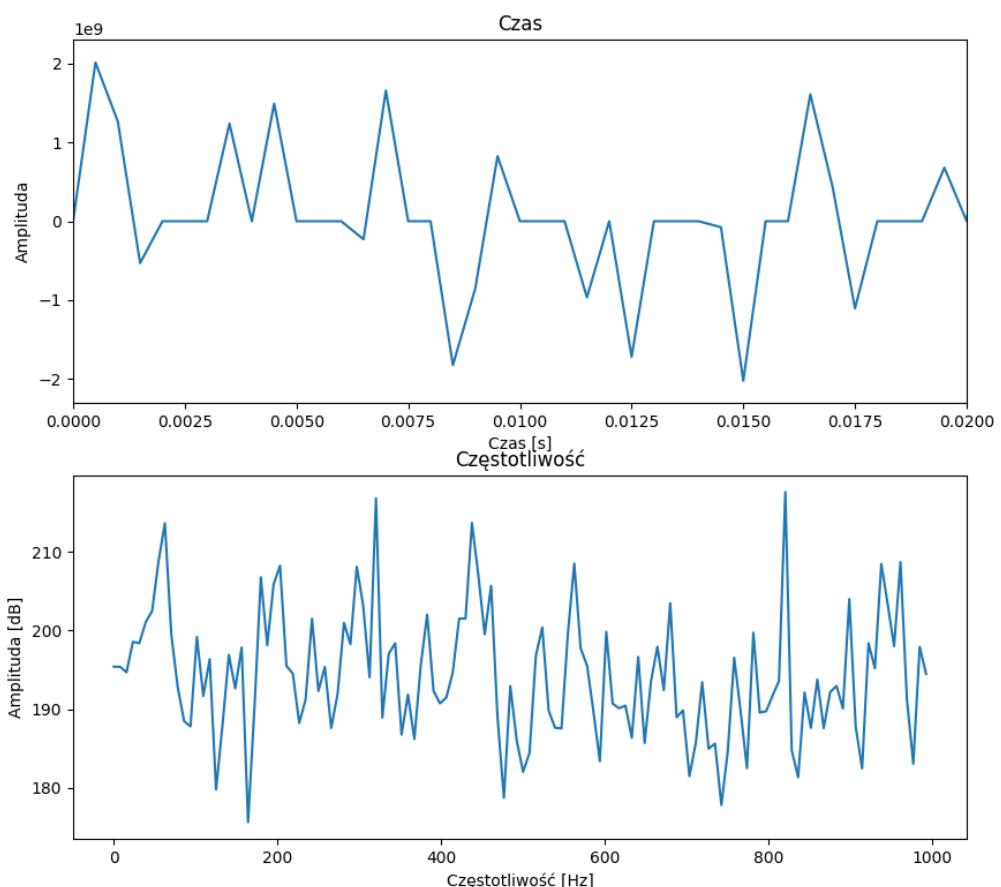
wartość losowa = [0.43460862]

Peak freq = 820.3125

Peak amp = 217.58698946600543

## Plik - SIN/sin\_combined.wav

Interpolacja liniowa, Fs 2000



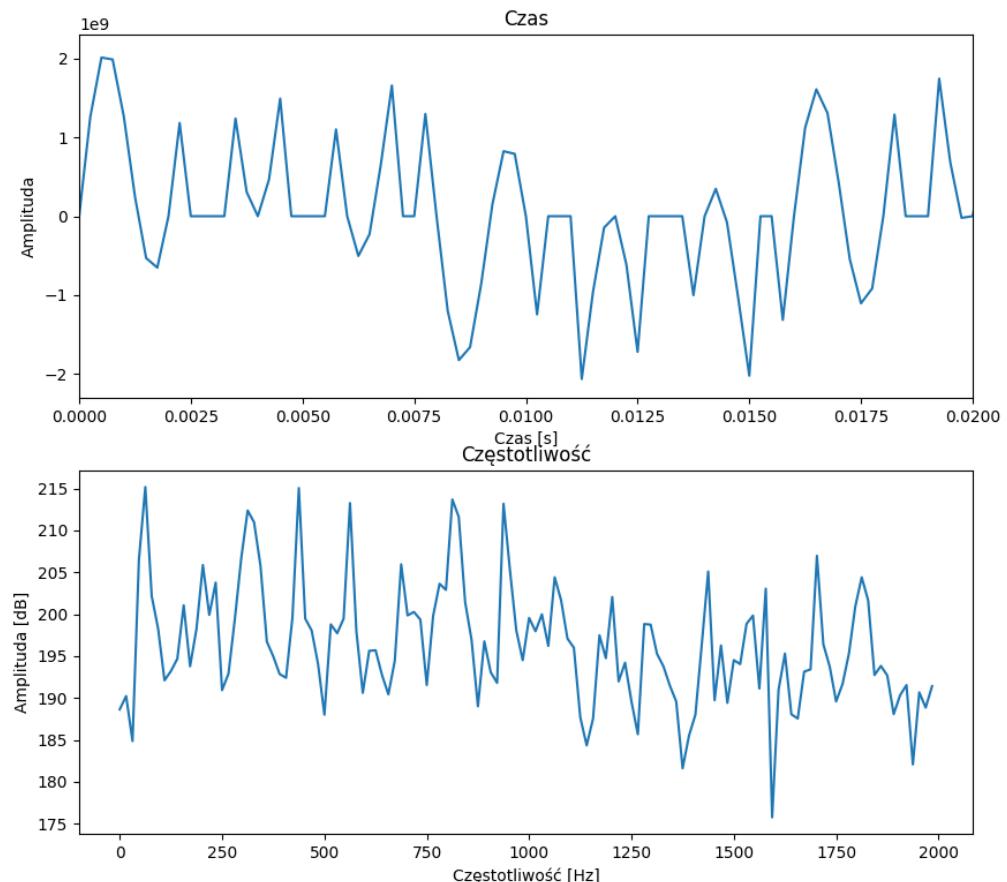
wartość losowa = [0.55049698]

Peak freq = 820.3125

Peak amp = 217.58698946600543

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 4000**



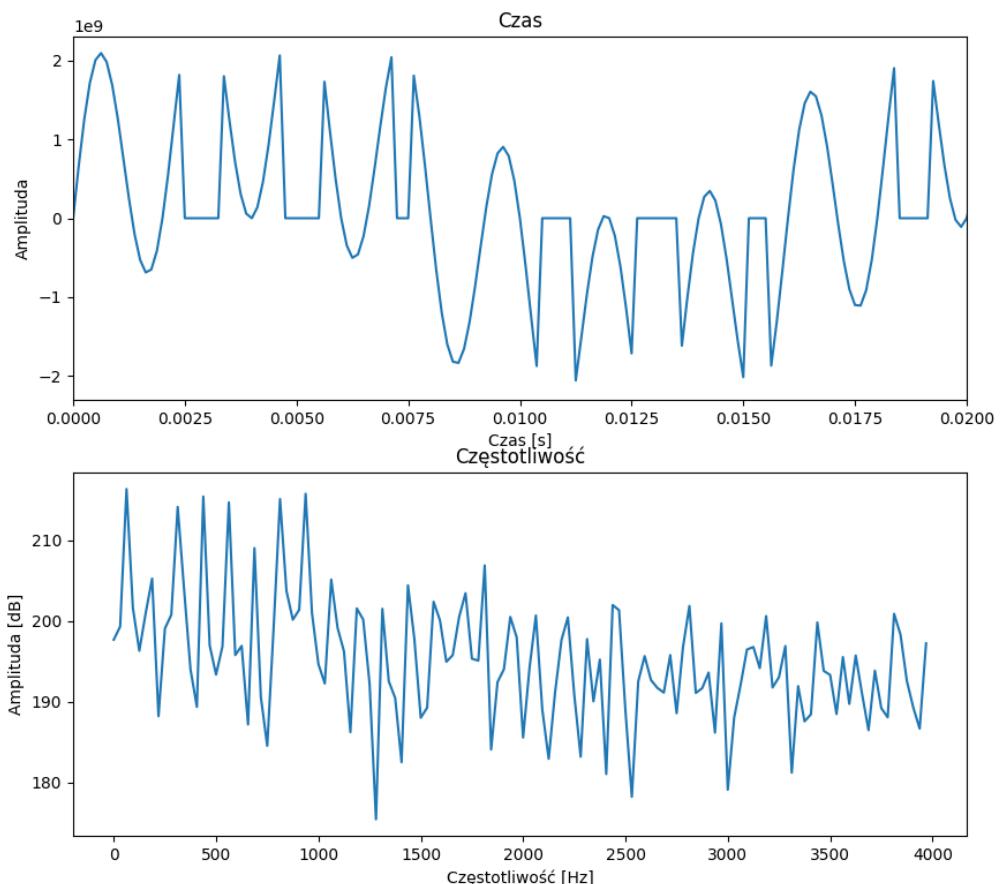
wartość losowa = [0.59641558]

Peak freq = 62.5

Peak amp = 215.1885147685008

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 8000**



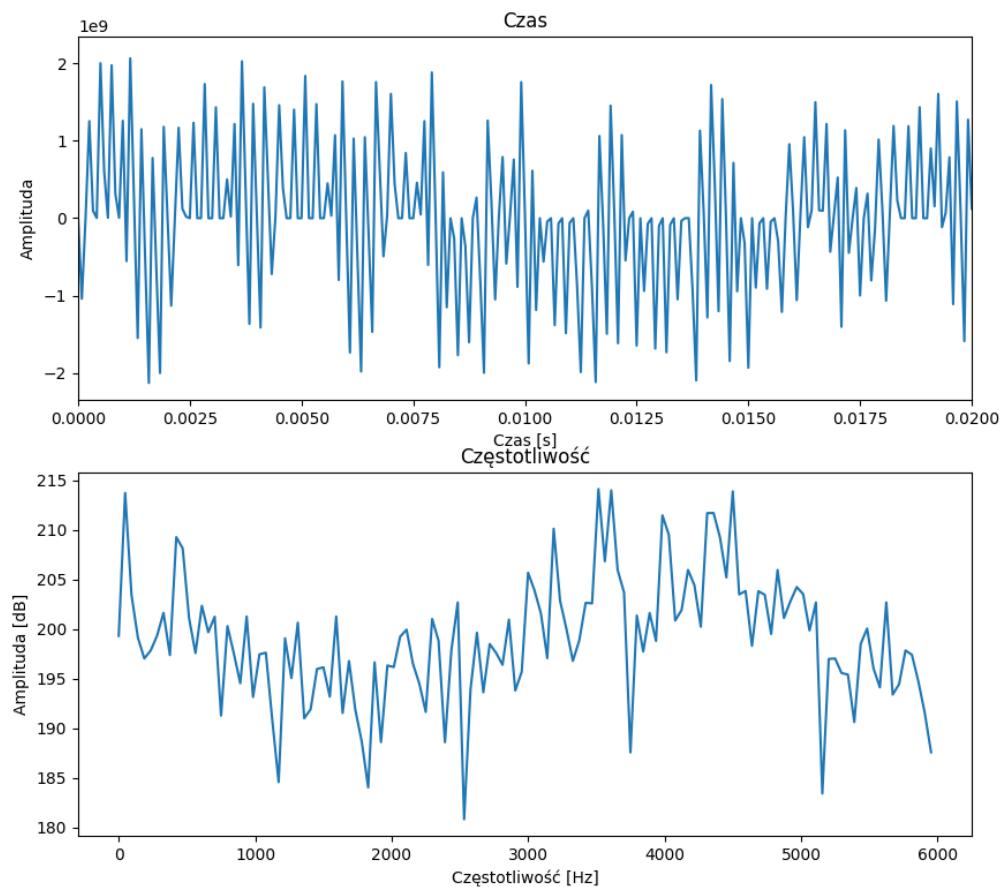
wartość losowa = [0.87950711]

Peak freq = 62.5

Peak amp = 216.33906327560518

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 11999**



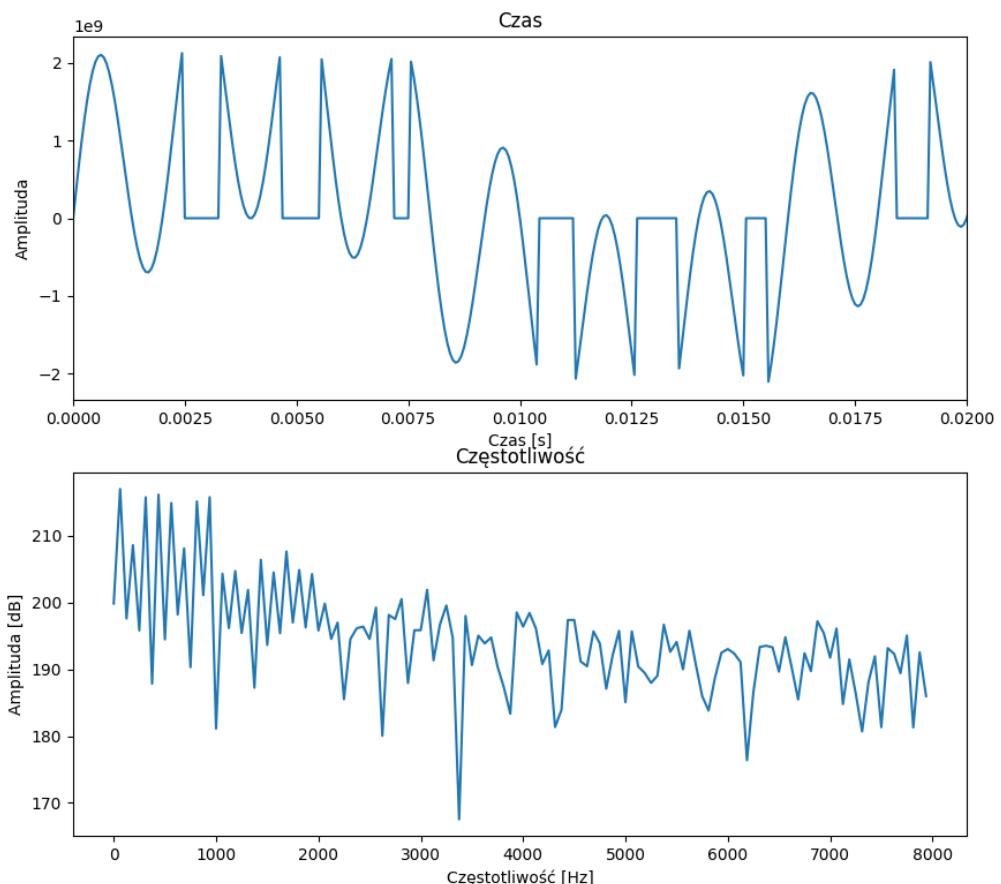
wartość losowa = [0.01105703]

Peak freq = 3515.33203125

Peak amp = 214.1085584580515

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 16000**



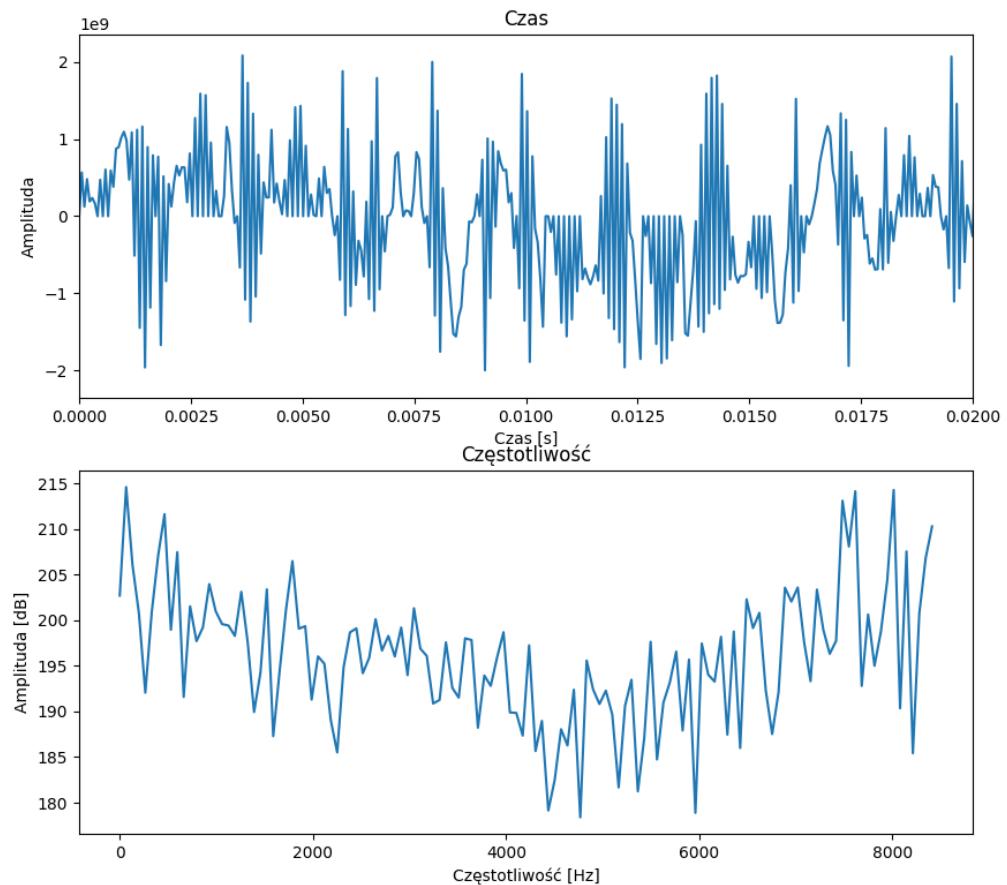
wartość losowa = [0.05886918]

Peak freq = 62.5

Peak amp = 217.01122149371272

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 16953**



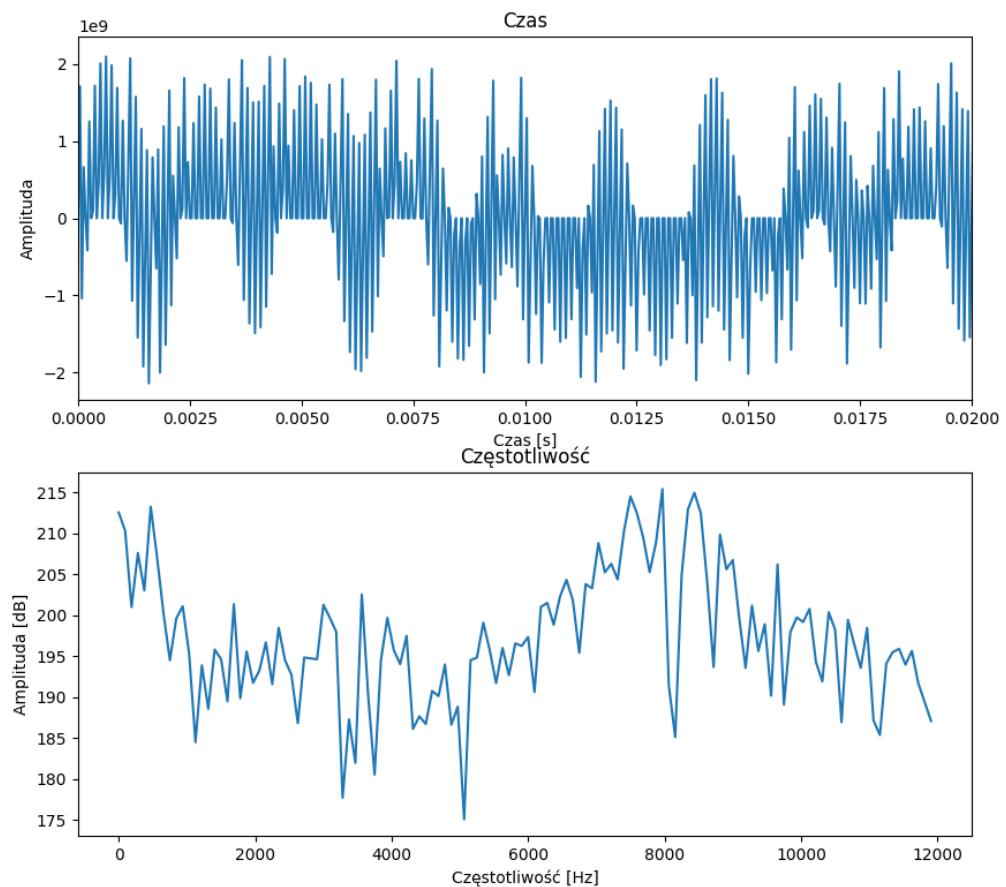
wartość losowa = [0.50637013]

Peak freq = 66.22265625

Peak amp = 214.5848582385797

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 24000**



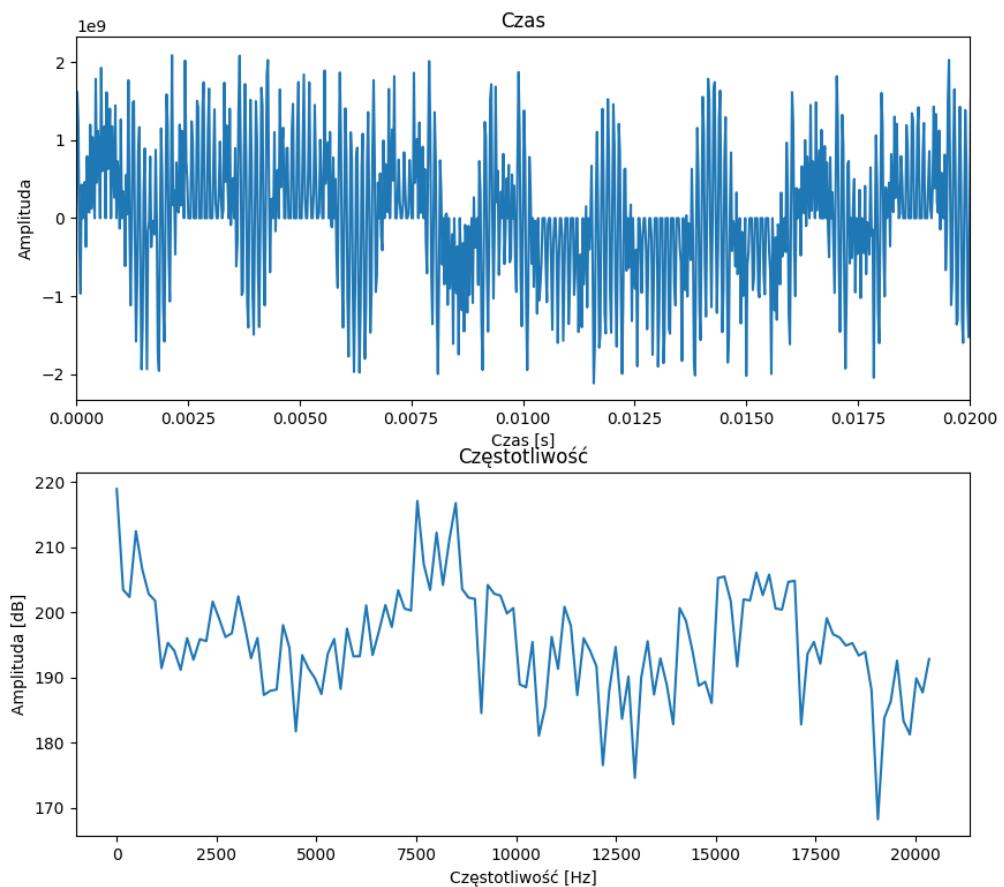
wartość losowa = [0.62516469]

Peak freq = 7968.75

Peak amp = 215.40030228021791

**Plik - SIN/sin\_combined.wav**

**Interpolacja liniowa, Fs 41000**



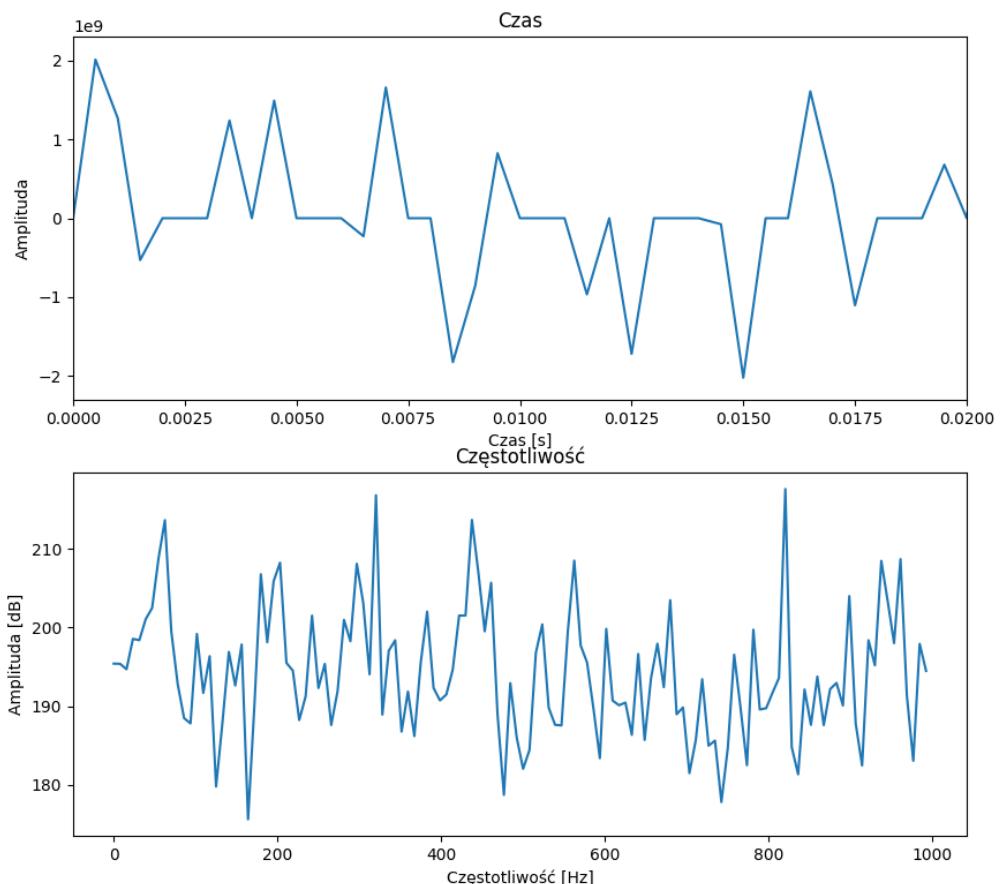
wartość losowa = [0.16743331]

Peak freq = 0.0

Peak amp = 218.88285090717105

## Plik - SIN/sin\_combined.wav

Interpolacja nieliniowa, Fs 2000



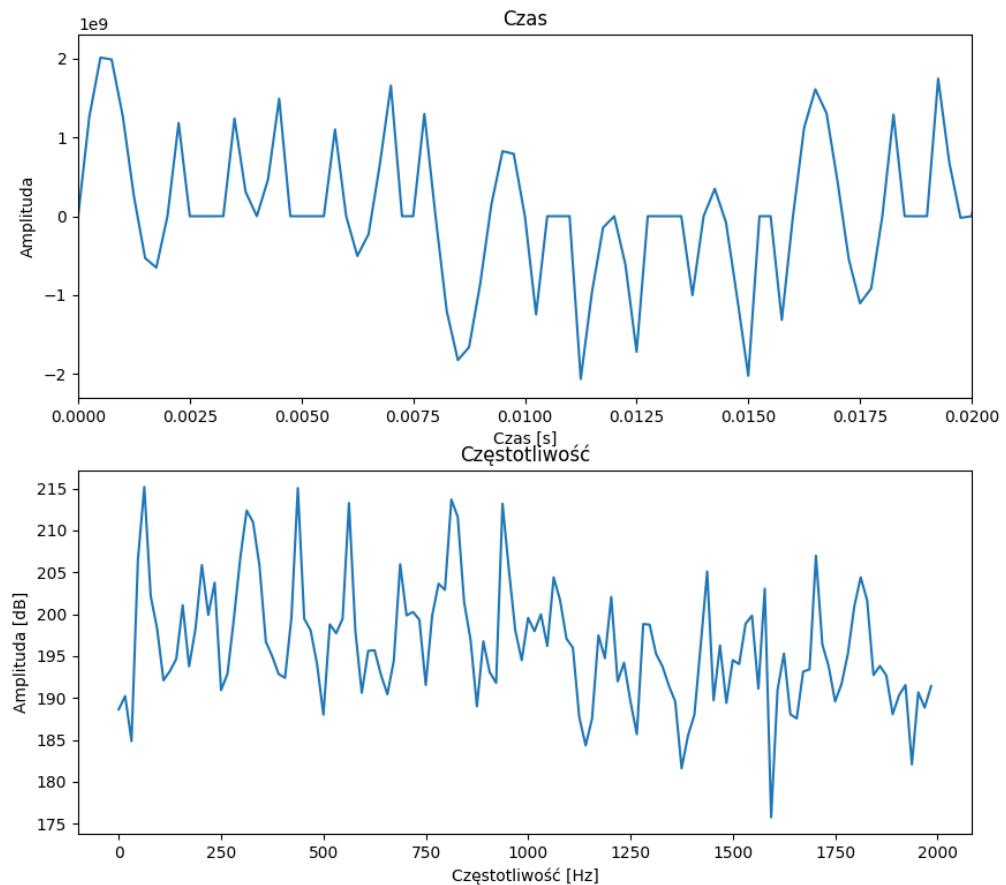
wartość losowa = [0.00355305]

Peak freq = 820.3125

Peak amp = 217.58698946600543

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 4000**



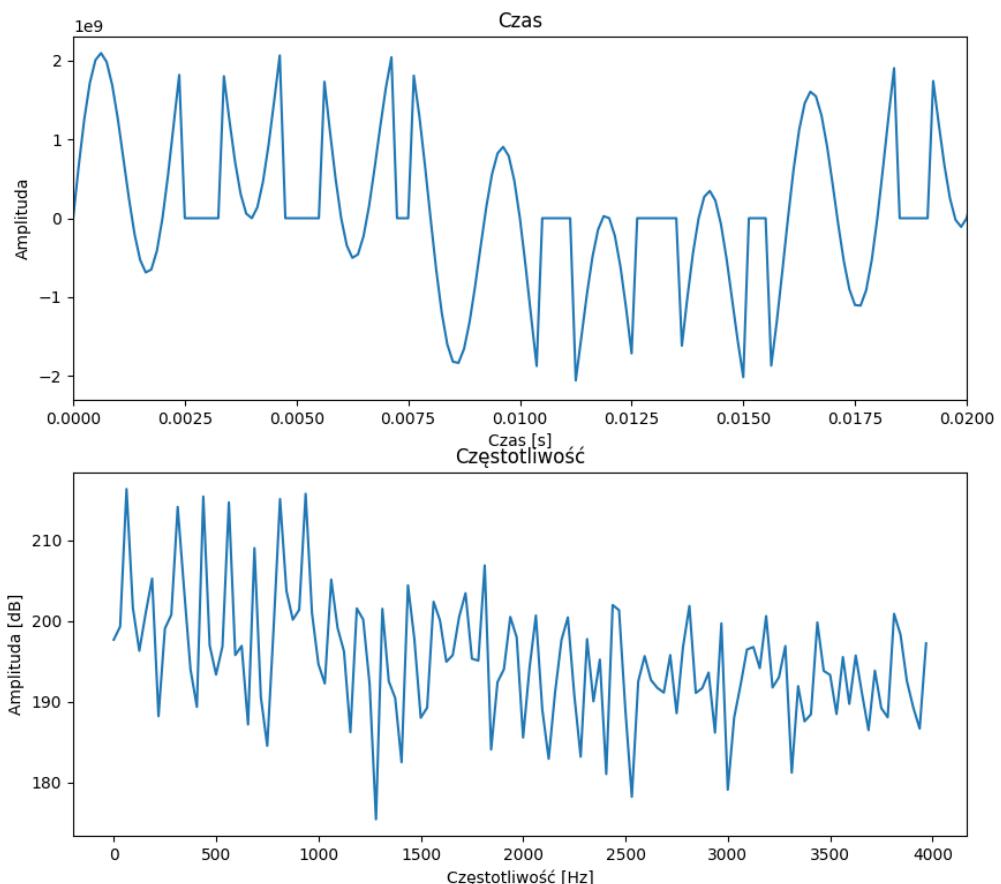
wartość losowa = [0.96223153]

Peak freq = 62.5

Peak amp = 215.18851476850082

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 8000**



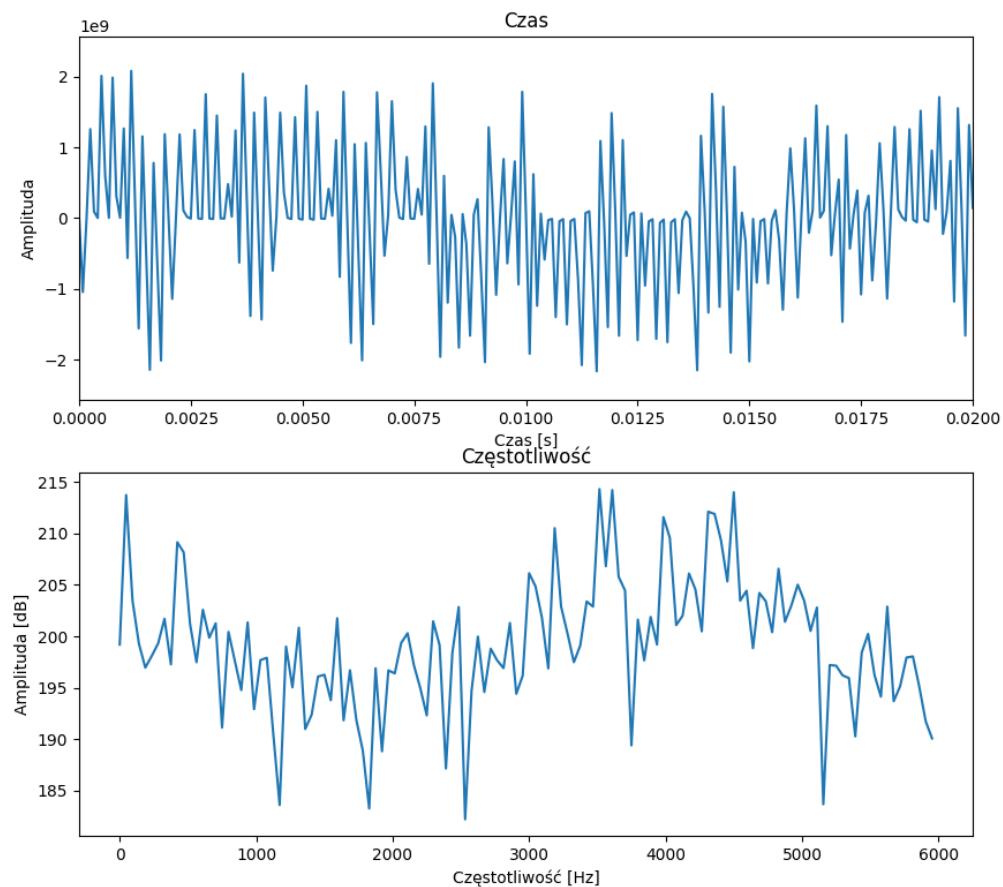
wartość losowa = [0.59032099]

Peak freq = 62.5

Peak amp = 216.33906327560518

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 11999**



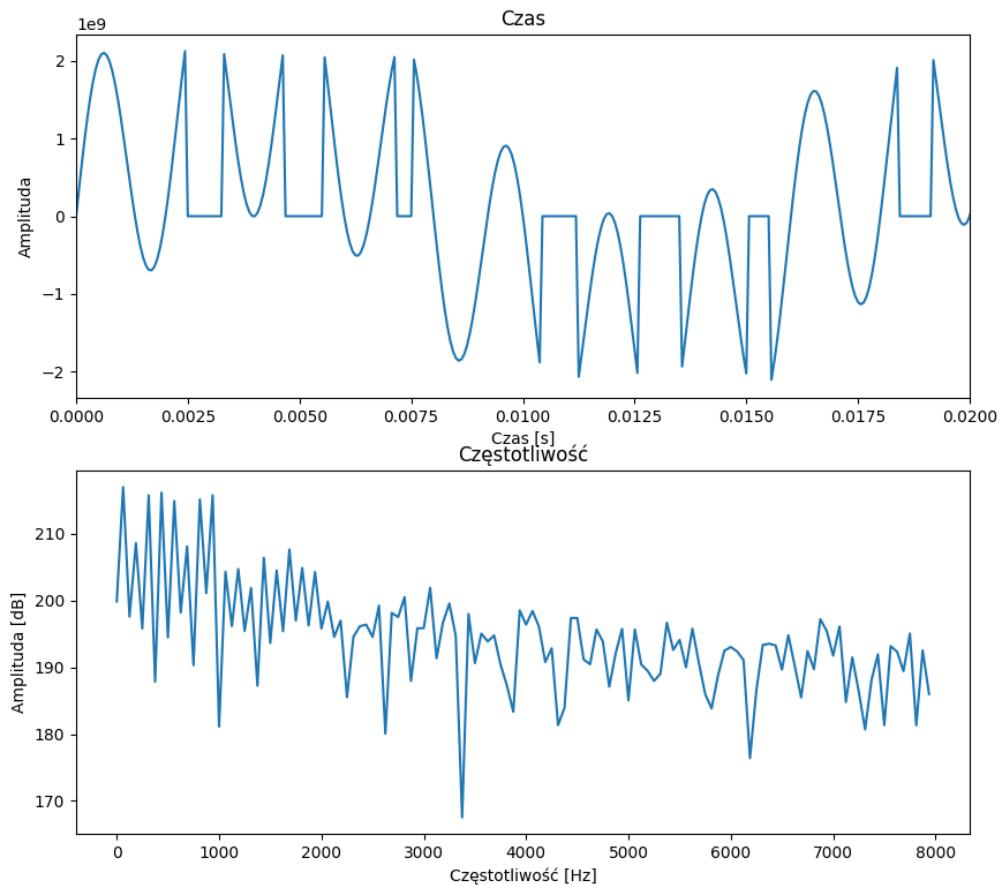
wartość losowa = [0.37719827]

Peak freq = 3515.33203125

Peak amp = 214.31987556171237

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 16000**



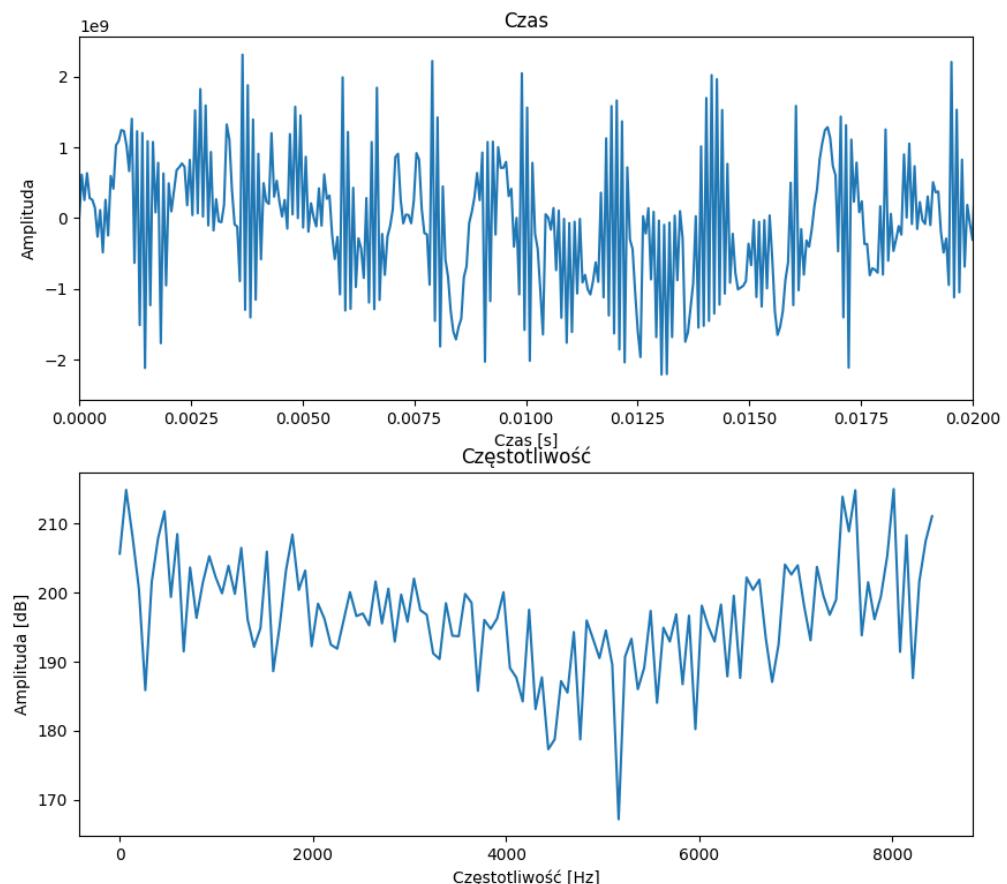
wartość losowa = [0.65393709]

Peak freq = 62.5

Peak amp = 217.01122149371272

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 16953**



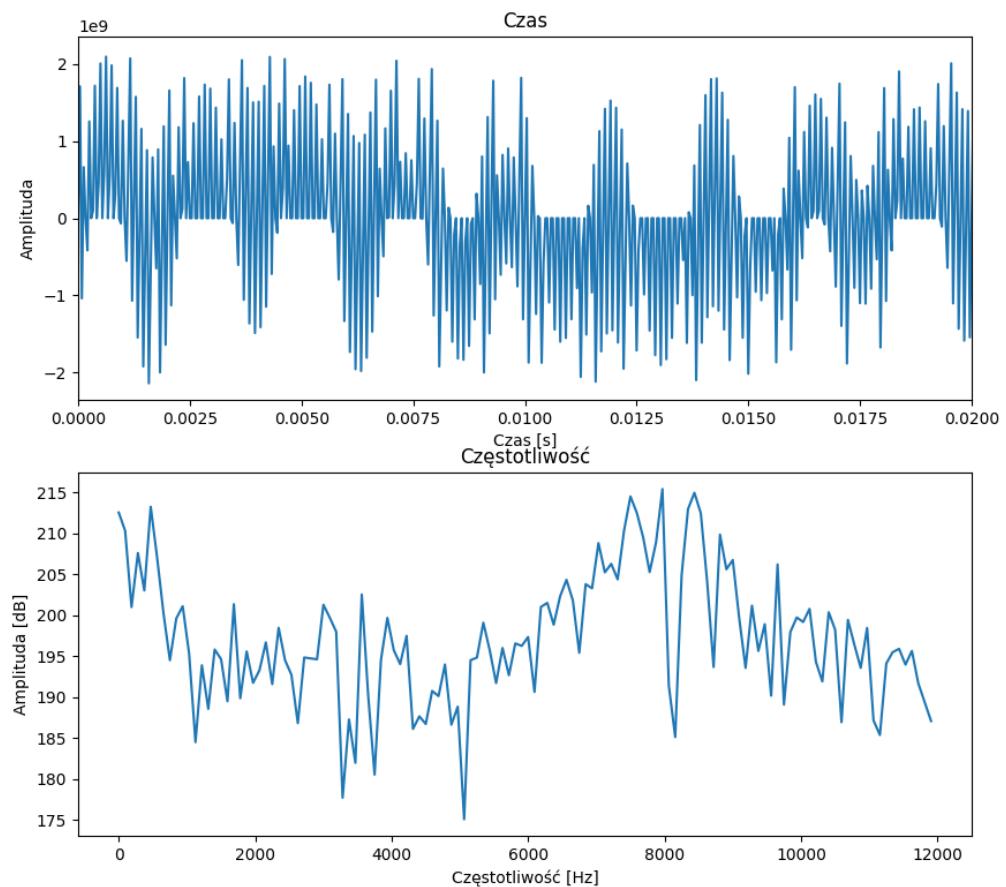
wartość losowa = [0.42560082]

Peak freq = 8012.94140625

Peak amp = 215.04246325121164

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 24000**



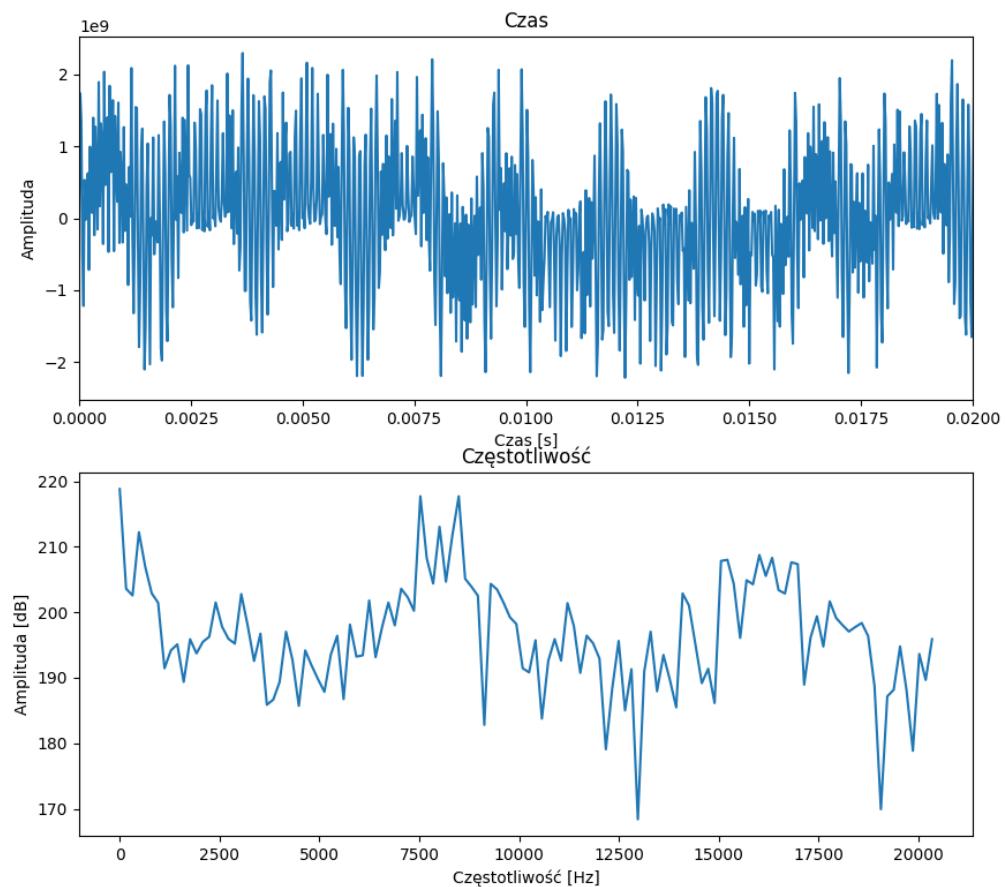
wartość losowa = [0.71546654]

Peak freq = 7968.75

Peak amp = 215.40030228021791

**Plik - SIN/sin\_combined.wav**

**Interpolacja nieliniowa, Fs 41000**



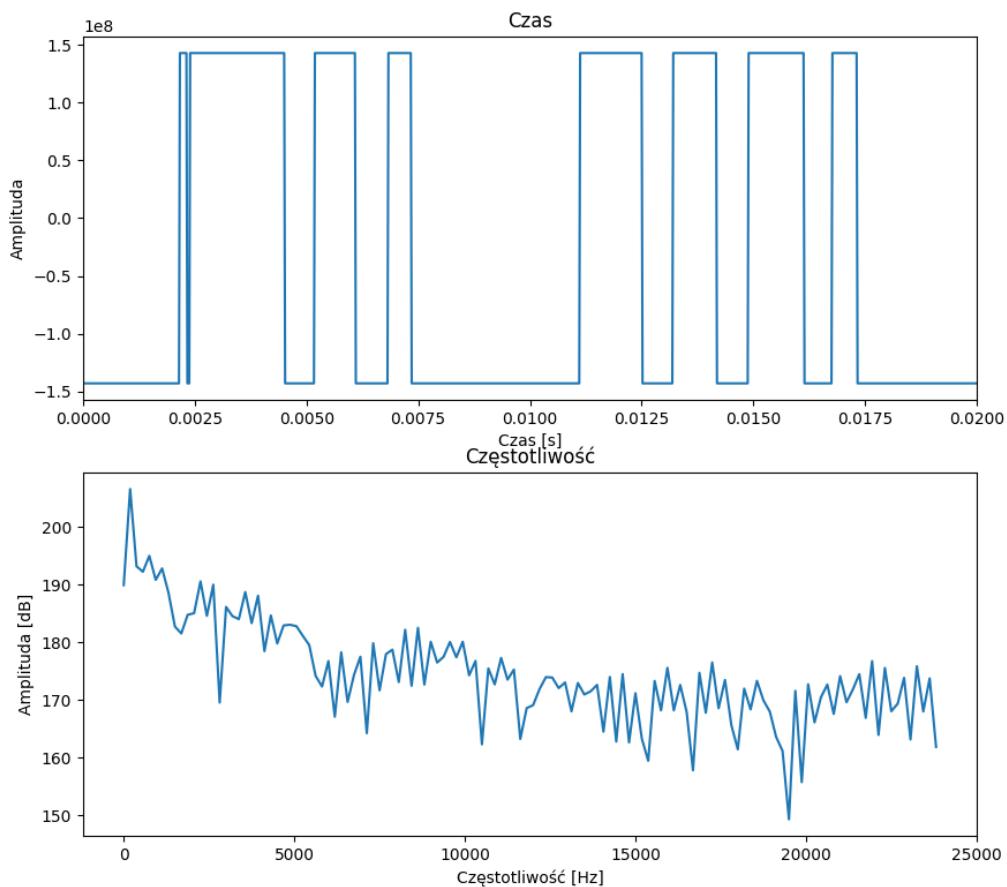
wartość losowa = [0.56888302]

Peak freq = 0.0

Peak amp = 218.81259014008515

## Plik - SING/sing\_low1.wav

### Kwantyzacja, Bit 4



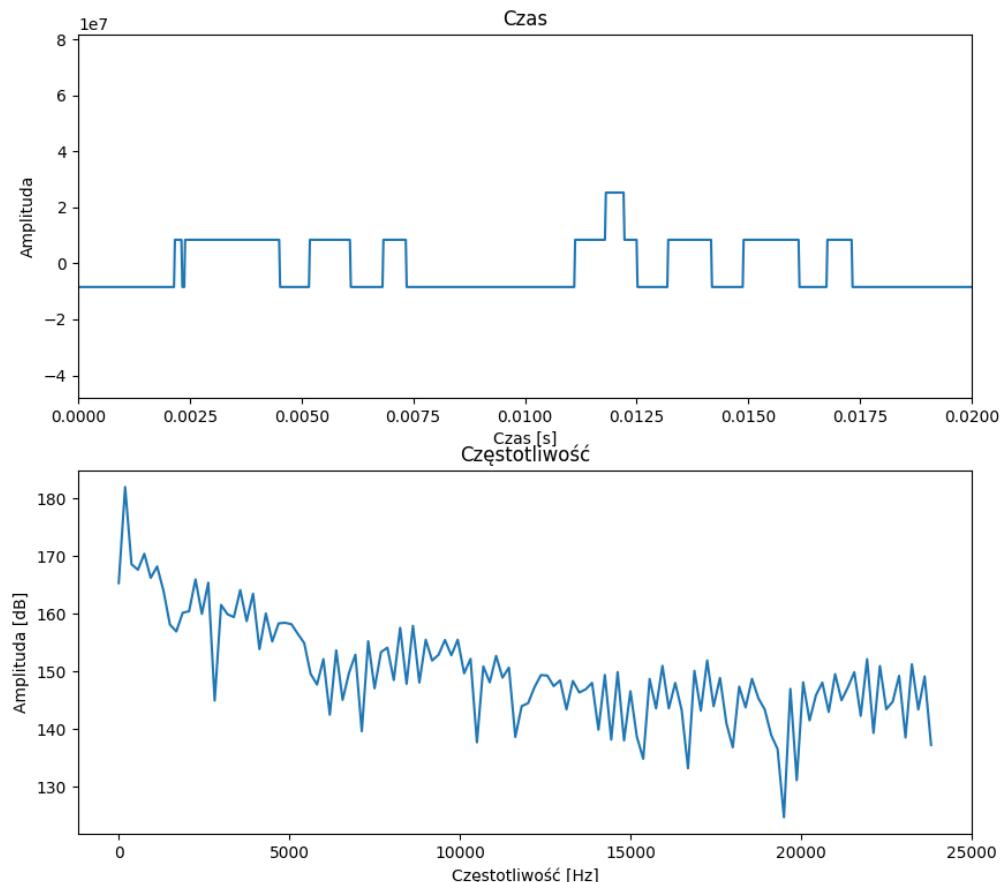
wartość losowa = [0.96922207]

Peak freq = 187.5

Peak amp = 206.6277149452993

**Plik - SING/sing\_low1.wav**

**Kwantyzacja, Bit 8**



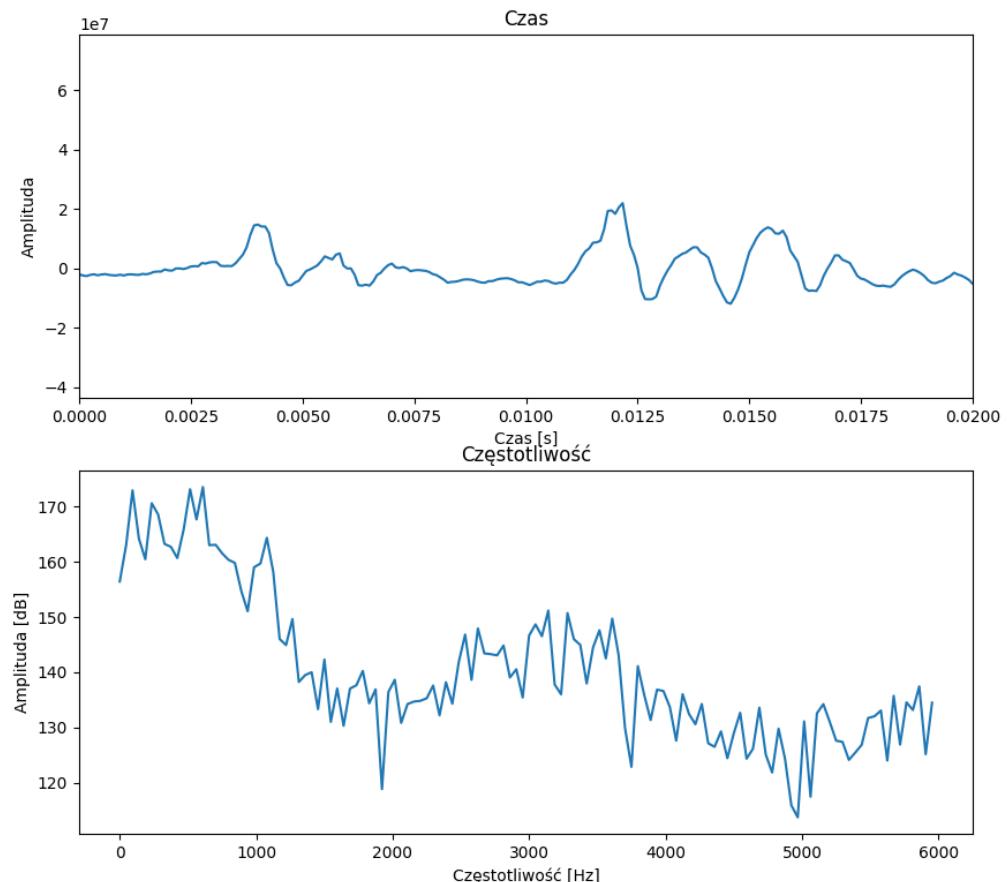
wartość losowa = [0.44397856]

Peak freq = 187.5

Peak amp = 182.0187365177338

**Plik - SING/sing\_low1.wav**

**Decymacja, N 4**



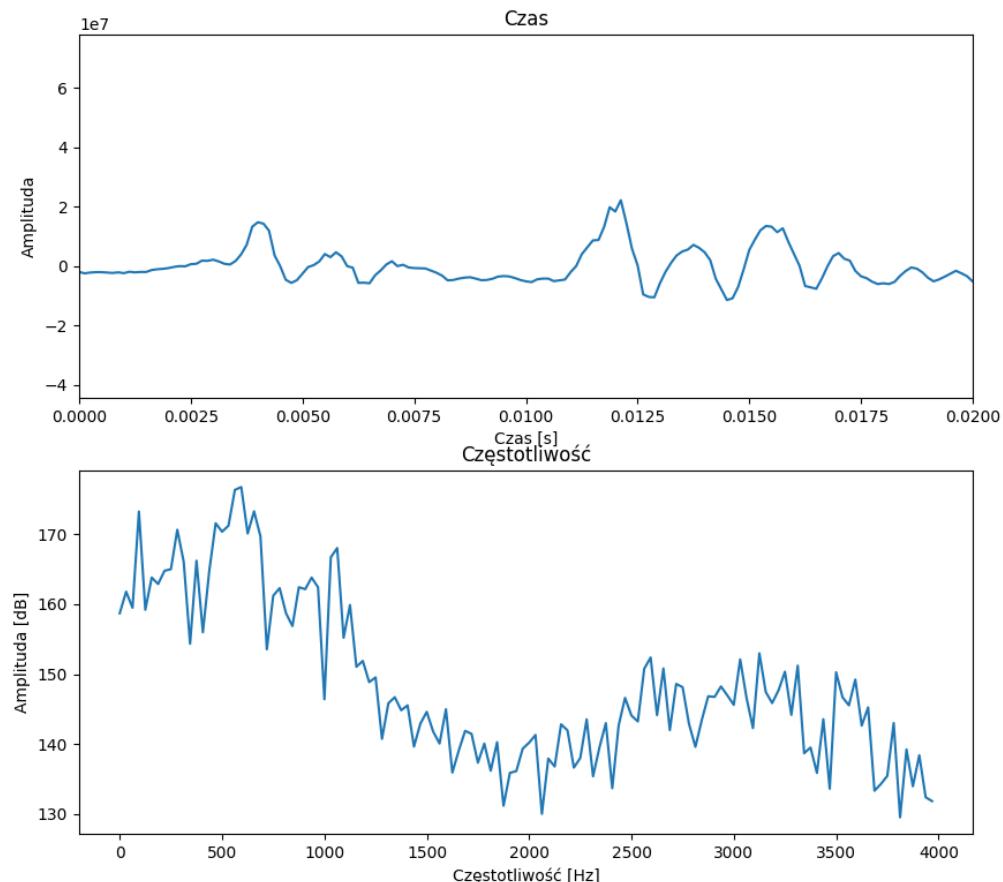
wartość losowa = [0.68021844]

Peak freq = 609.375

Peak amp = 173.56187193466408

**Plik - SING/sing\_low1.wav**

**Decymacja, N 6**



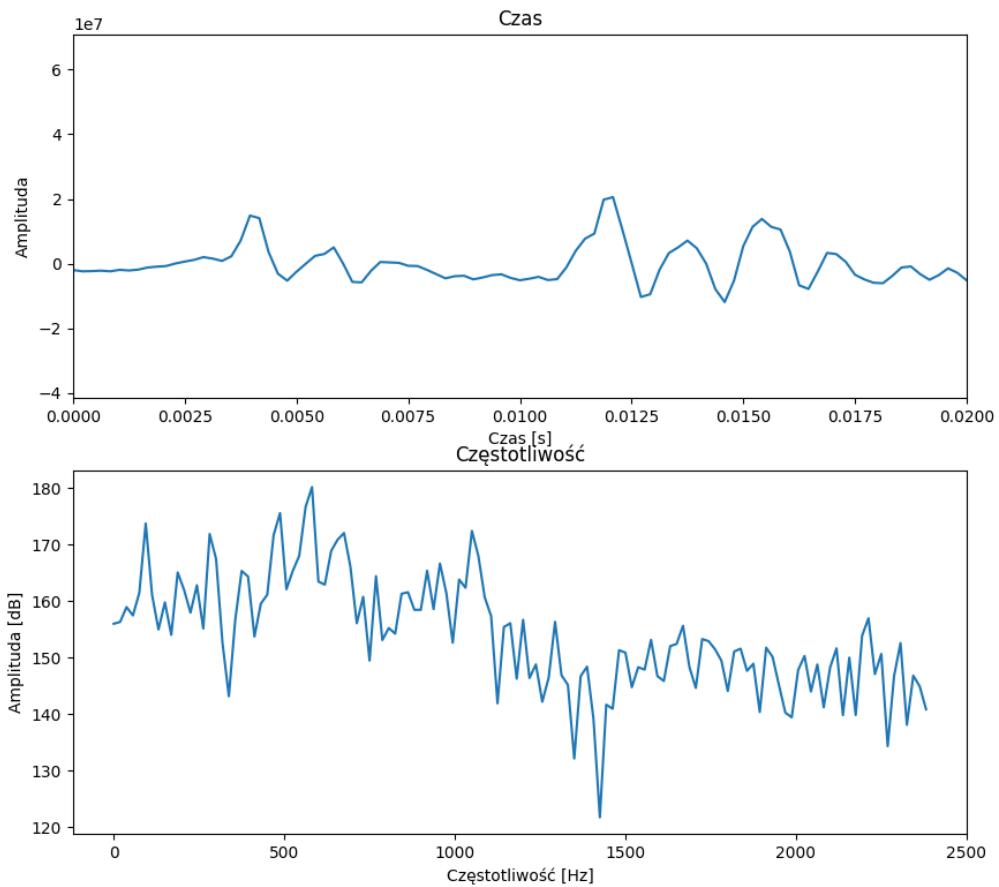
wartość losowa = [0.81125081]

Peak freq = 593.75

Peak amp = 176.75131088228272

**Plik - SING/sing\_low1.wav**

**Decymacja, N 10**



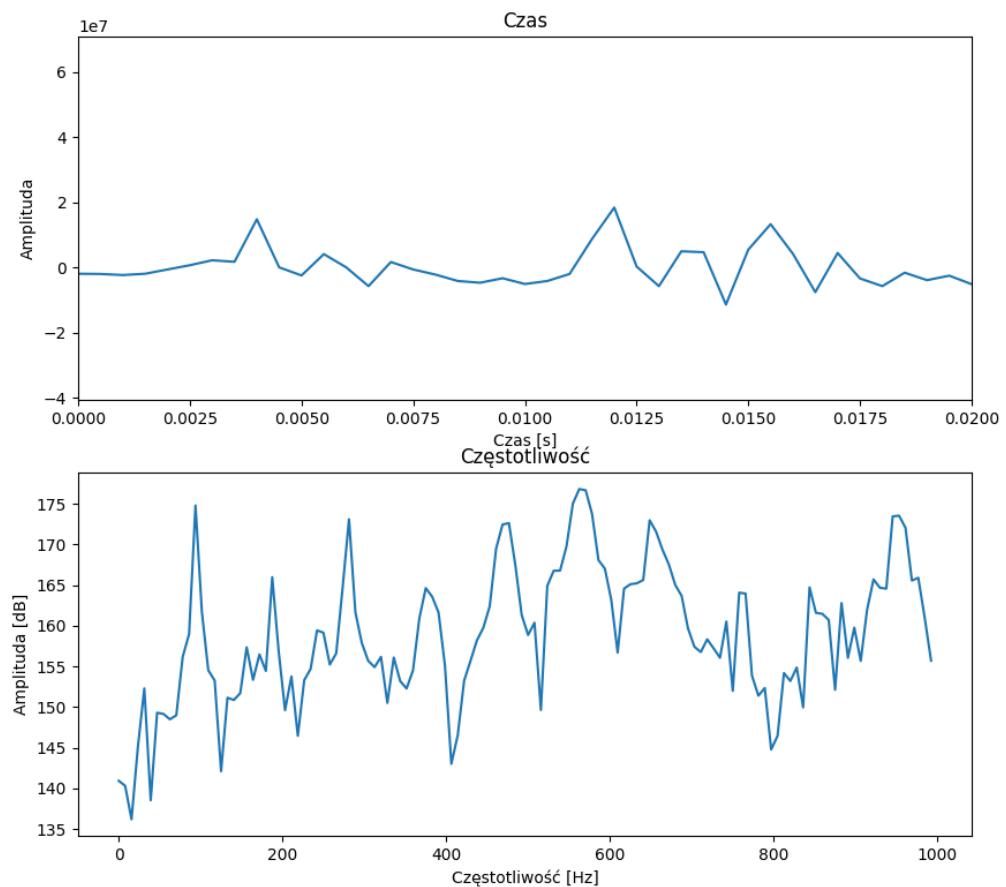
wartość losowa = [0.816355]

Peak freq = 581.25

Peak amp = 180.18340796464568

**Plik - SING/sing\_low1.wav**

**Decymacja, N 24**



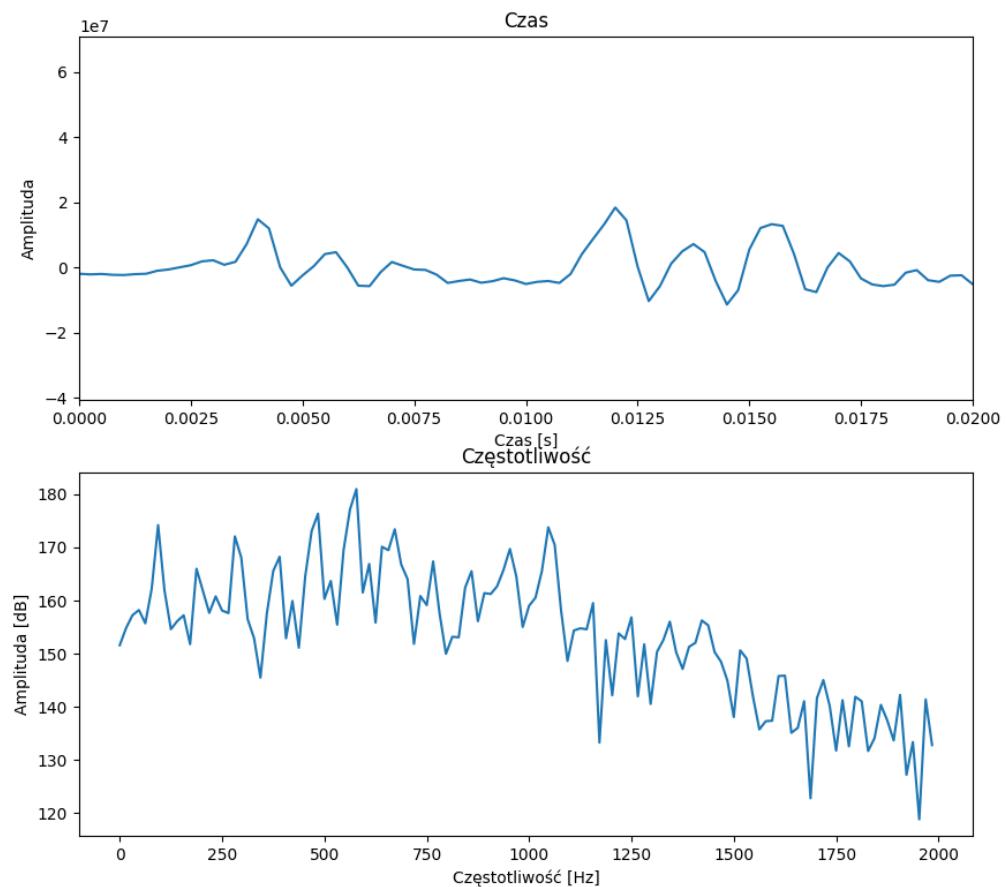
wartość losowa = [0.27633256]

Peak freq = 562.5

Peak amp = 176.81848721687481

Plik - SING/sing\_low1.wav

Interpolacja liniowa, Fs 4000



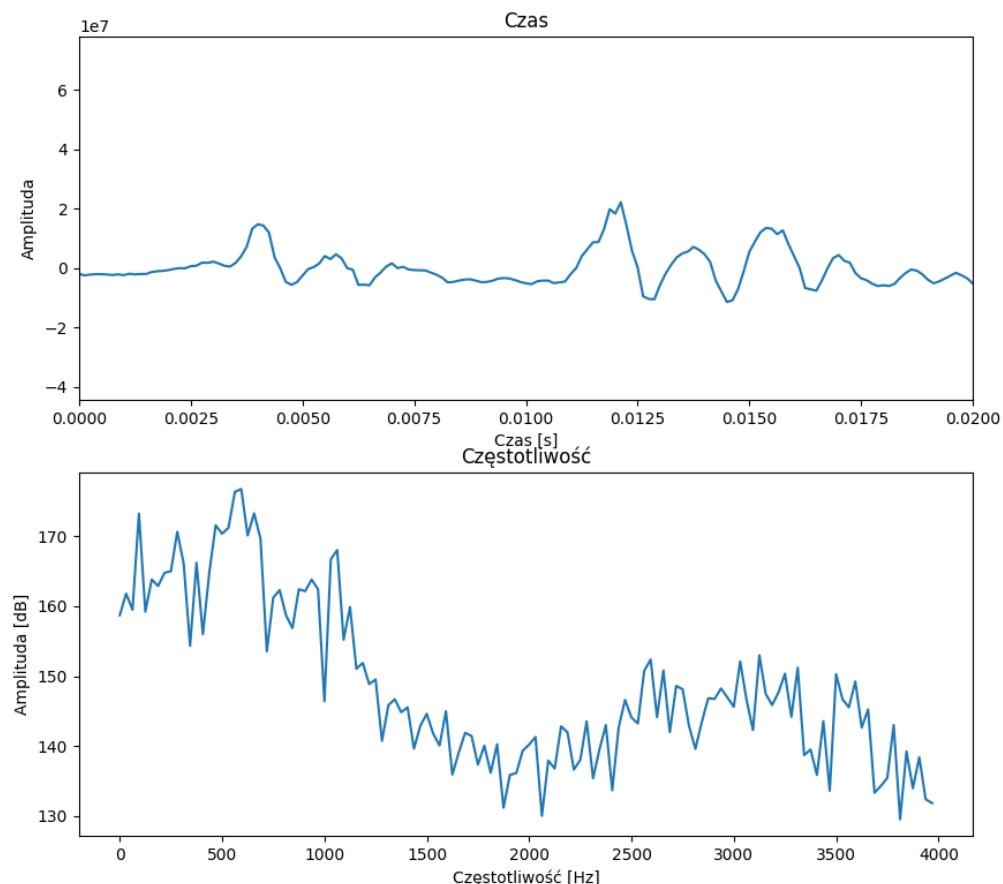
wartość losowa = [0.76857356]

Peak freq = 578.125

Peak amp = 180.9875072450987

Plik - SING/sing\_low1.wav

Interpolacja liniowa, Fs 8000



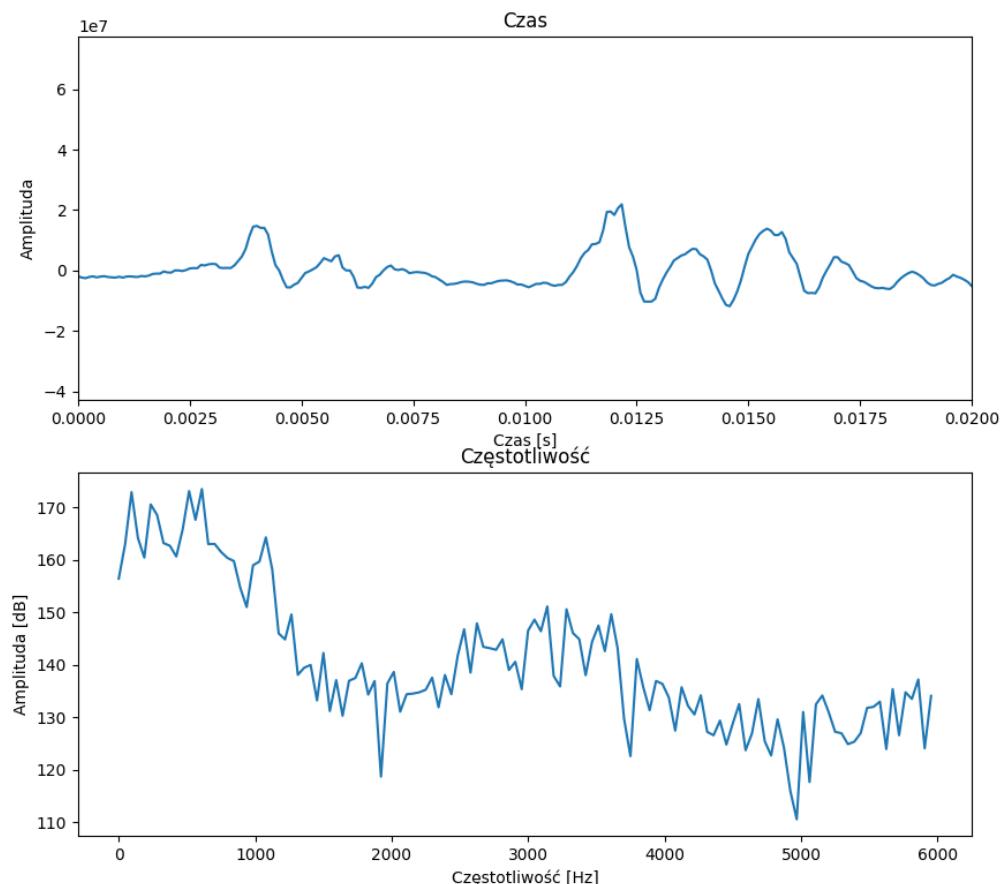
wartość losowa = [0.06290081]

Peak freq = 593.75

Peak amp = 176.75131088228272

Plik - SING/sing\_low1.wav

Interpolacja liniowa, Fs 11999



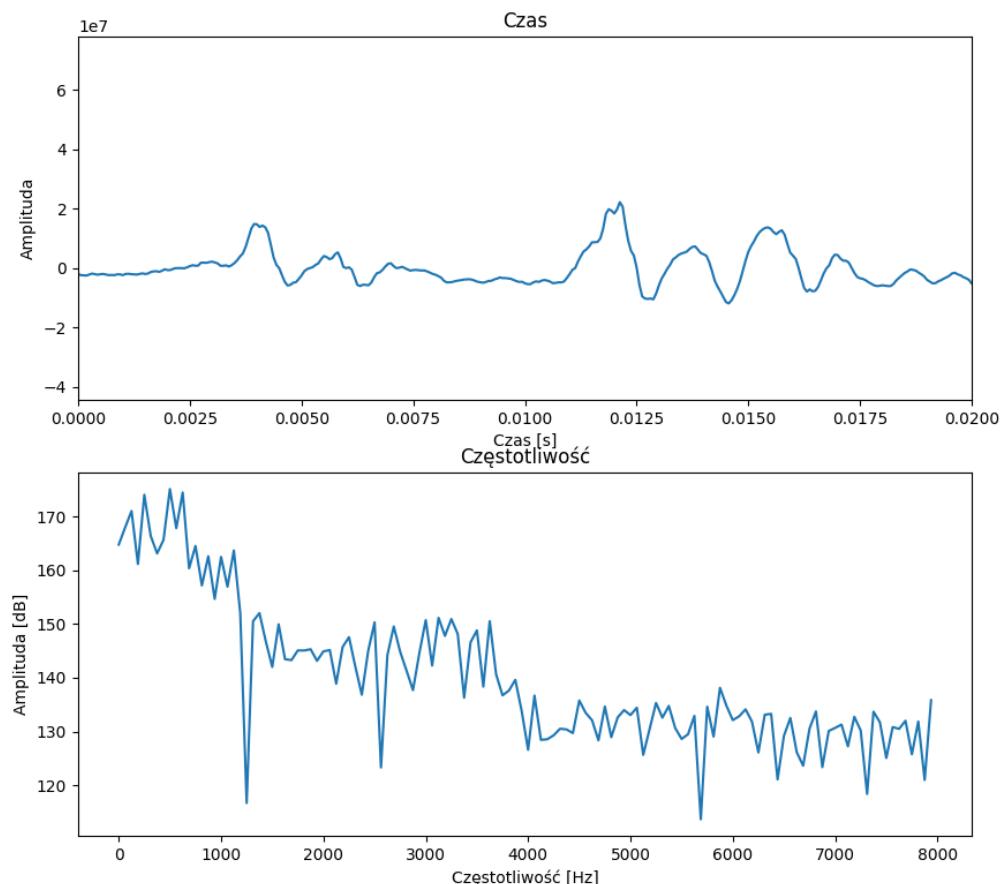
wartość losowa = [0.50623289]

Peak freq = 609.32421875

Peak amp = 173.5591987226964

Plik - SING/sing\_low1.wav

Interpolacja liniowa, Fs 16000



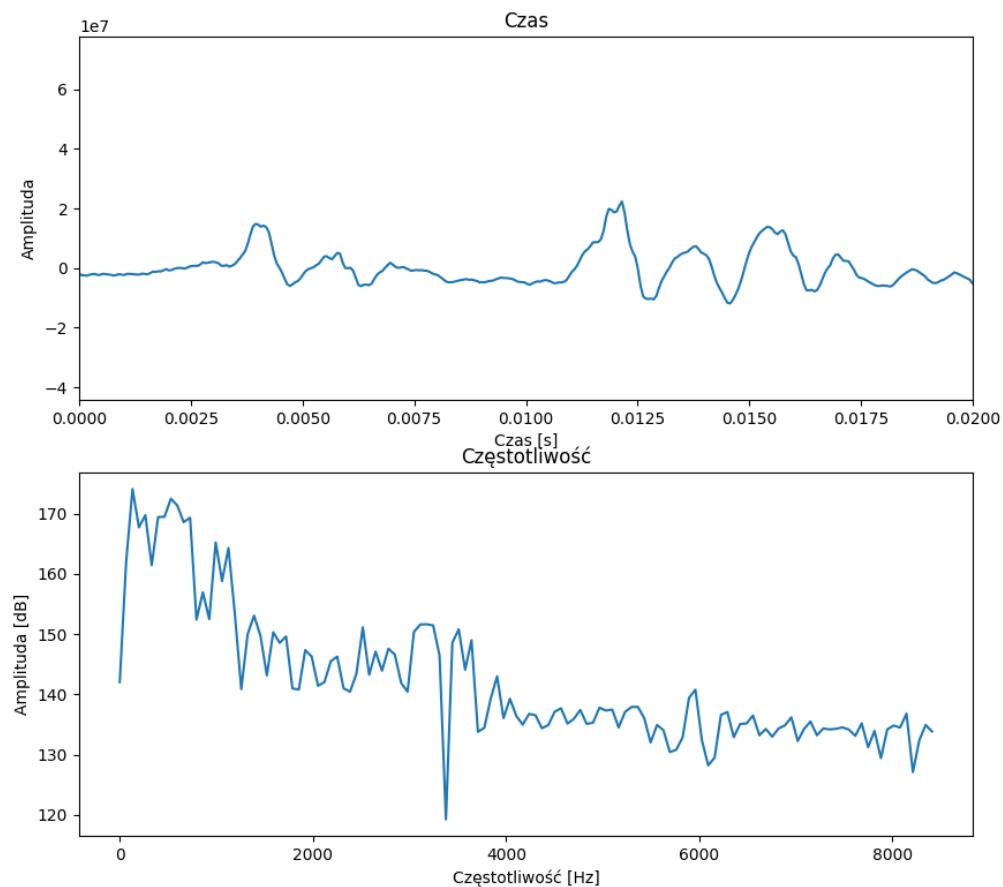
wartość losowa = [0.95499327]

Peak freq = 500.0

Peak amp = 175.08635273074717

Plik - SING/sing\_low1.wav

Interpolacja liniowa, Fs 16953



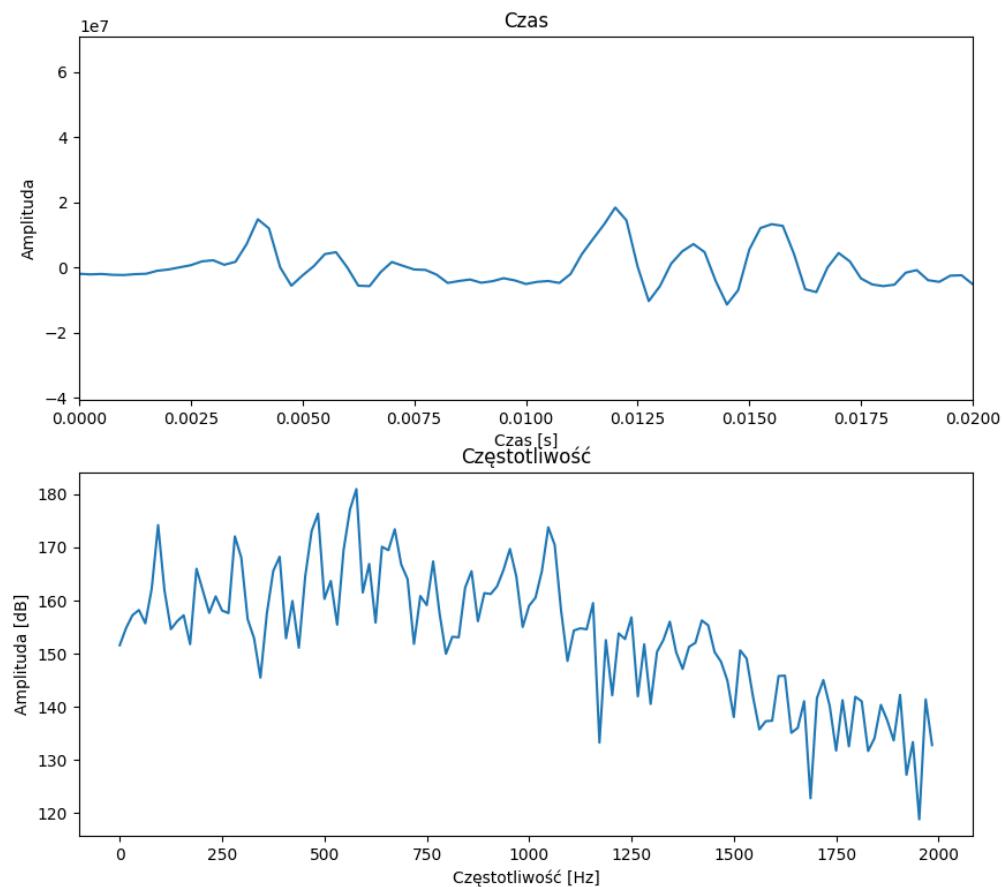
wartość losowa = [0.09032862]

Peak freq = 132.4453125

Peak amp = 174.08737364531976

Plik - SING/sing\_low1.wav

Interpolacja nieliniowa, Fs 4000



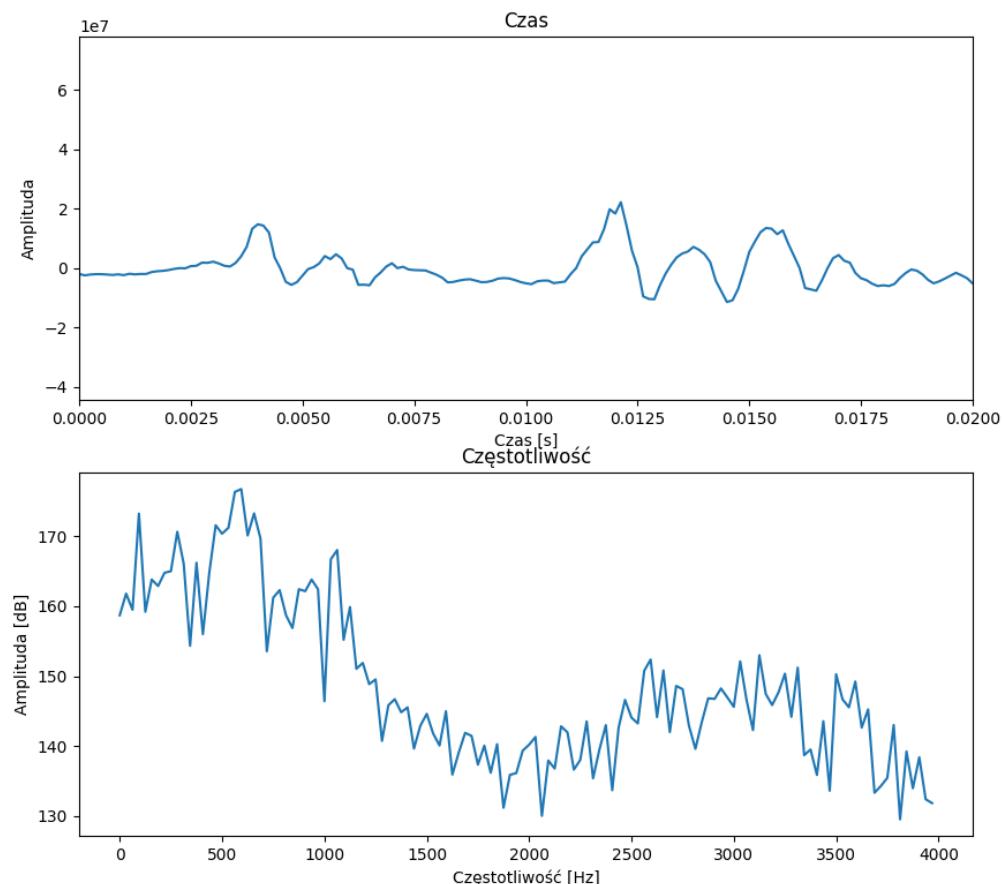
wartość losowa = [0.40972789]

Peak freq = 578.125

Peak amp = 180.9875072450987

Plik - SING/sing\_low1.wav

Interpolacja nieliniowa, Fs 8000



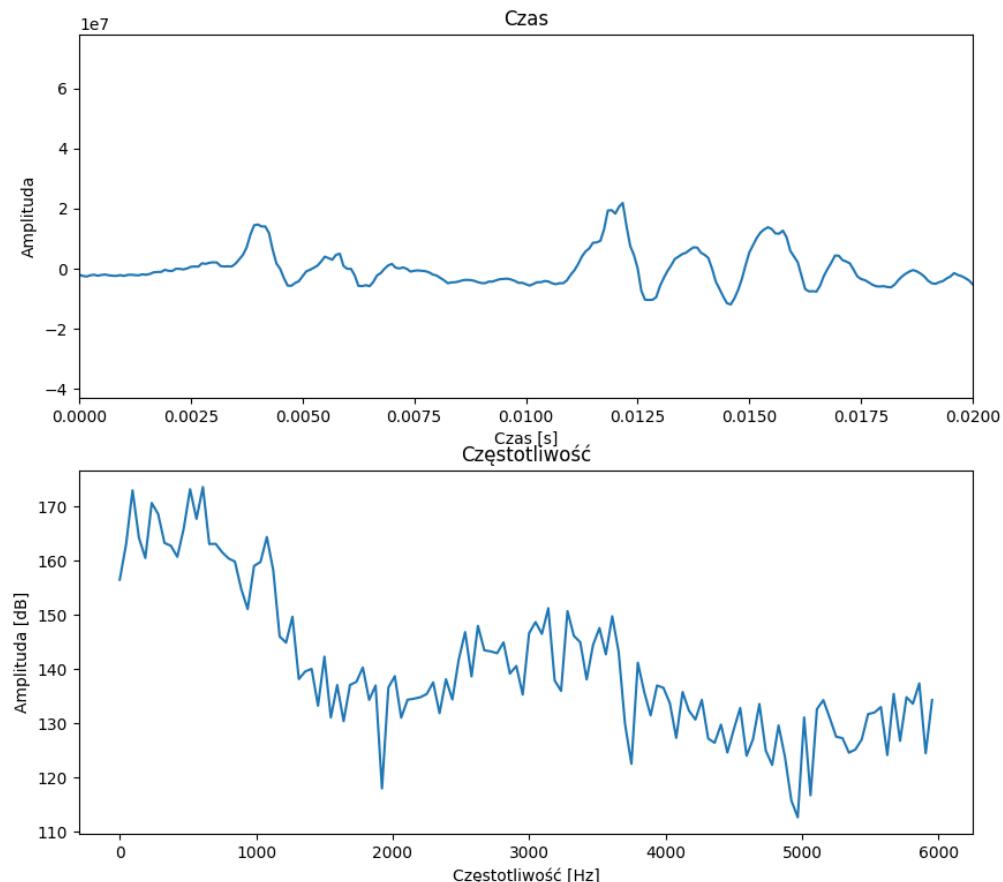
wartość losowa = [0.25081203]

Peak freq = 593.75

Peak amp = 176.75131088228272

Plik - SING/sing\_low1.wav

Interpolacja nieliniowa, Fs 11999



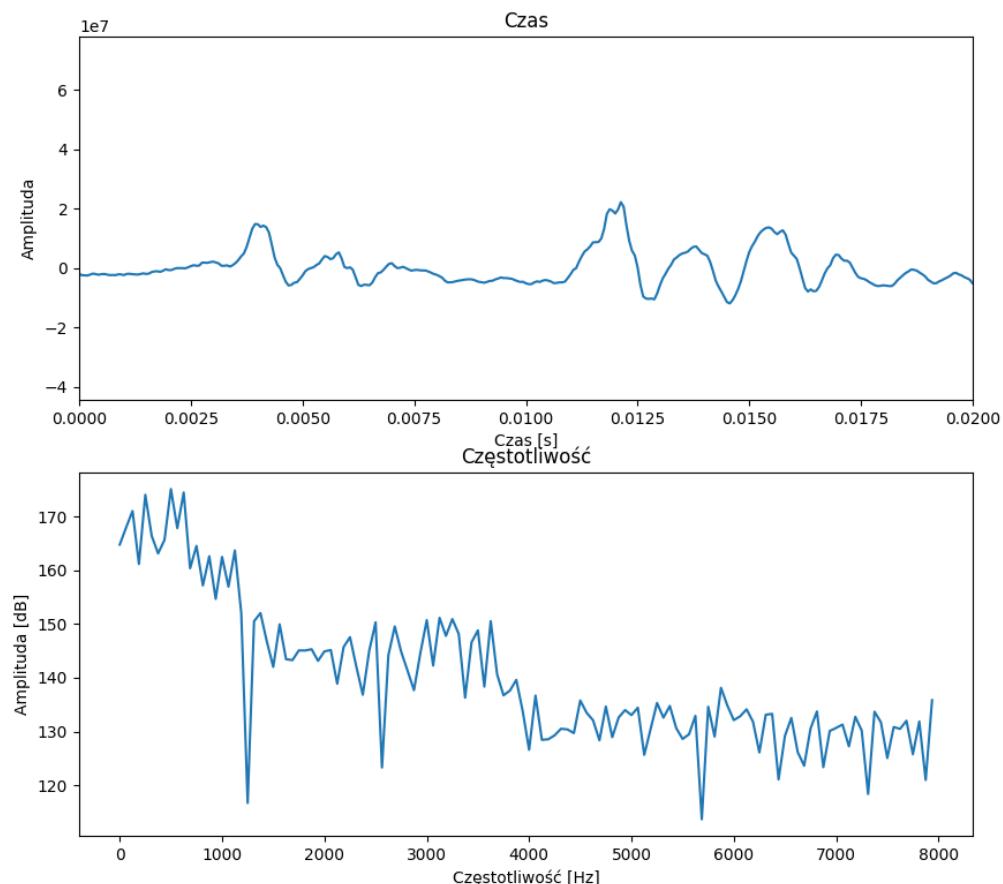
wartość losowa = [0.18303973]

Peak freq = 609.32421875

Peak amp = 173.56183831656153

Plik - SING/sing\_low1.wav

Interpolacja nieliniowa, Fs 16000



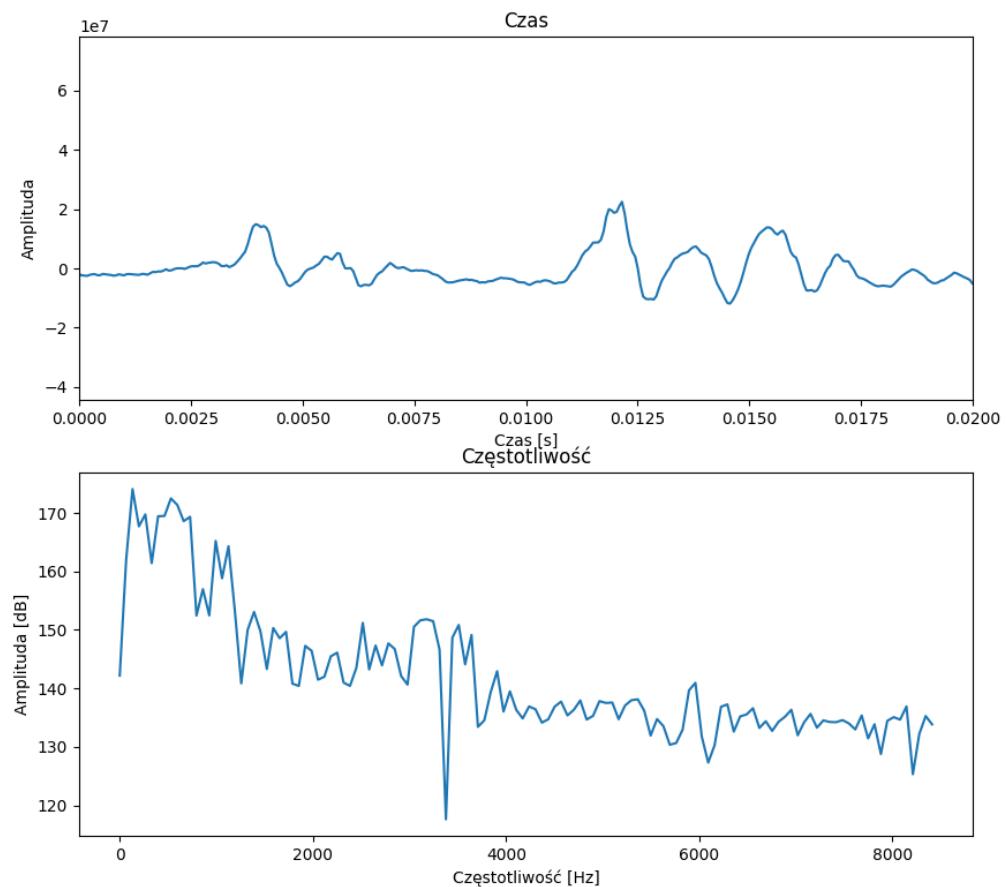
wartość losowa = [0.93318868]

Peak freq = 500.0

Peak amp = 175.08635273074717

Plik - SING/sing\_low1.wav

Interpolacja nieliniowa, Fs 16953



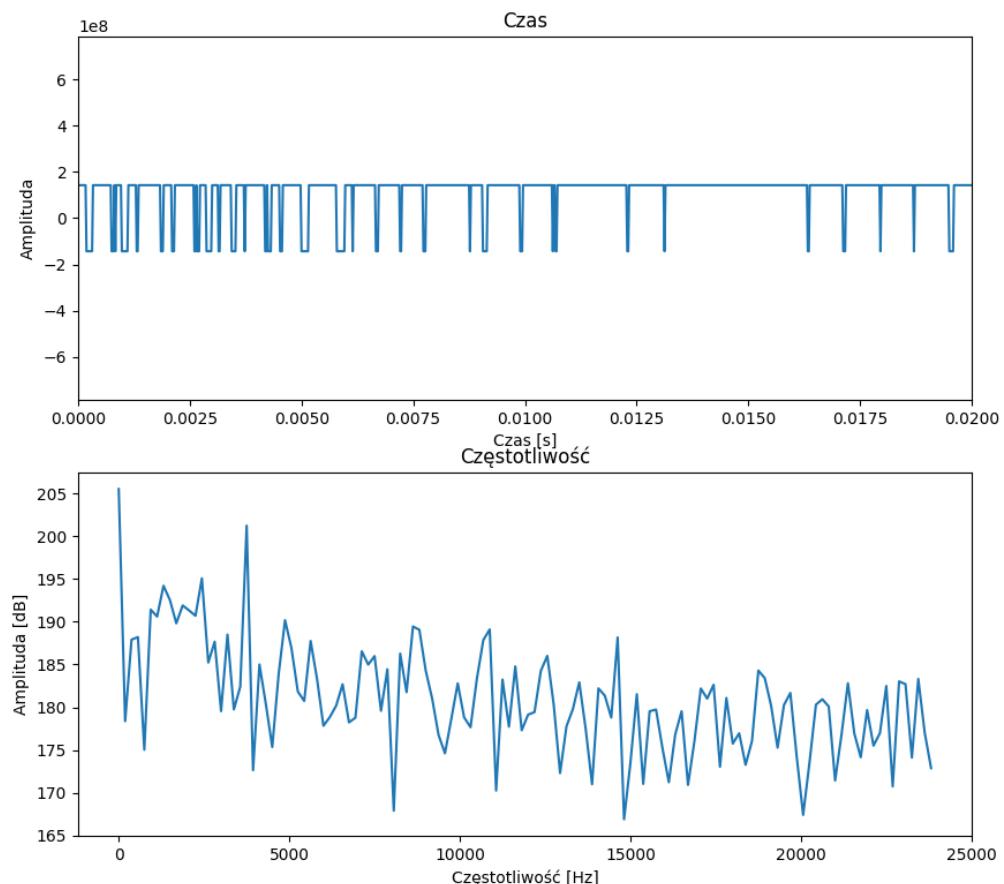
wartość losowa = [0.91663045]

Peak freq = 132.4453125

Peak amp = 174.09037389273448

## Plik - SING/sing\_high1.wav

### Kwantyzacja, Bit 4



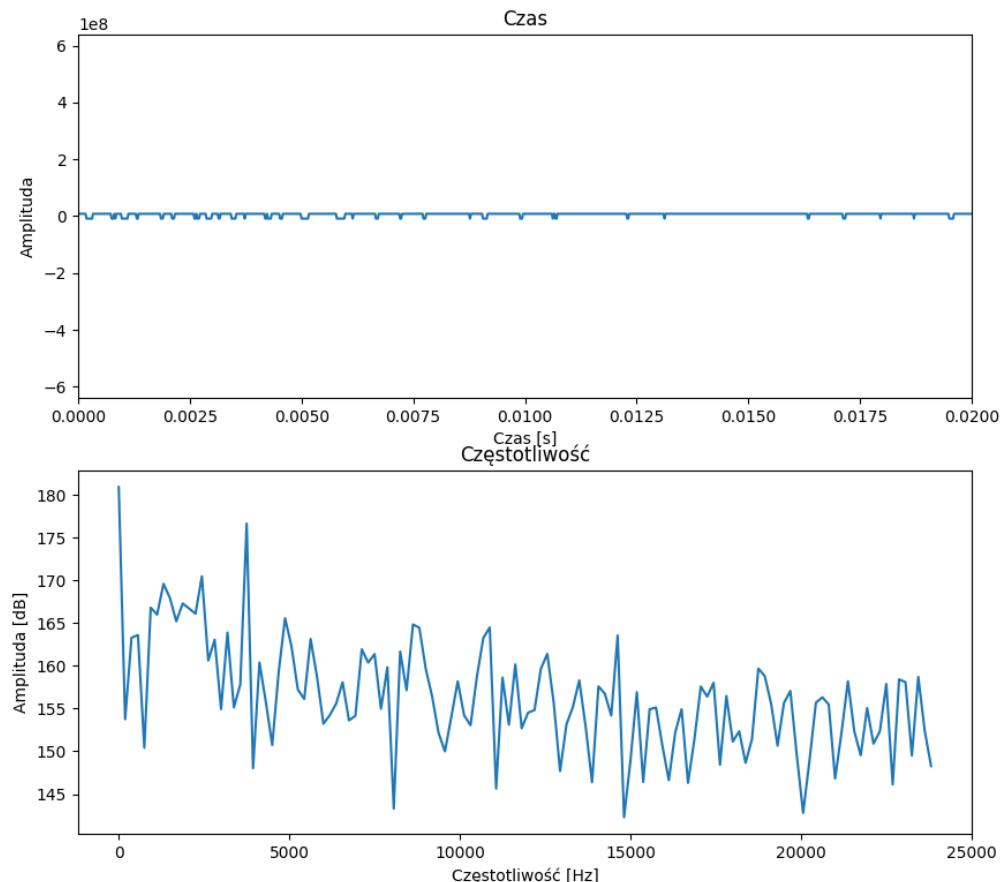
wartość losowa = [0.46187496]

Peak freq = 0.0

Peak amp = 205.5282508130269

## Plik - SING/sing\_high1.wav

### Kwantyzacja, Bit 8



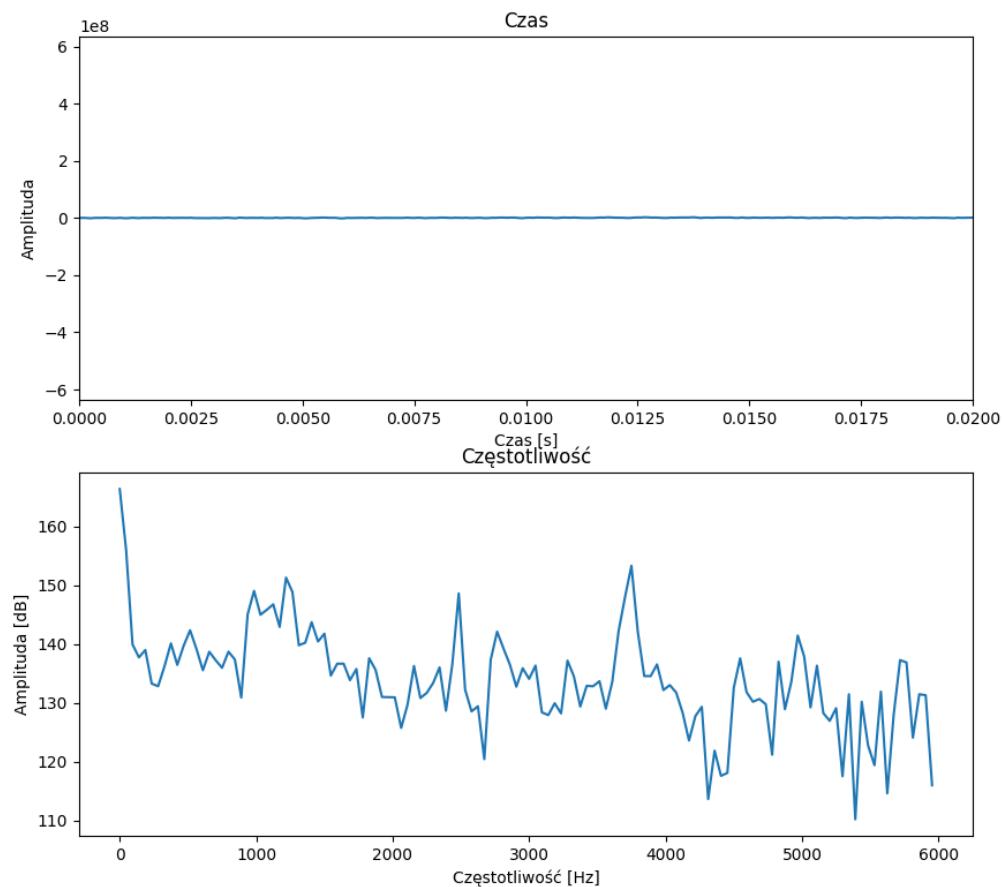
wartość losowa = [0.36427834]

Peak freq = 0.0

Peak amp = 180.91927144415345

## Plik - SING/sing\_high1.wav

Decymacja, N 4



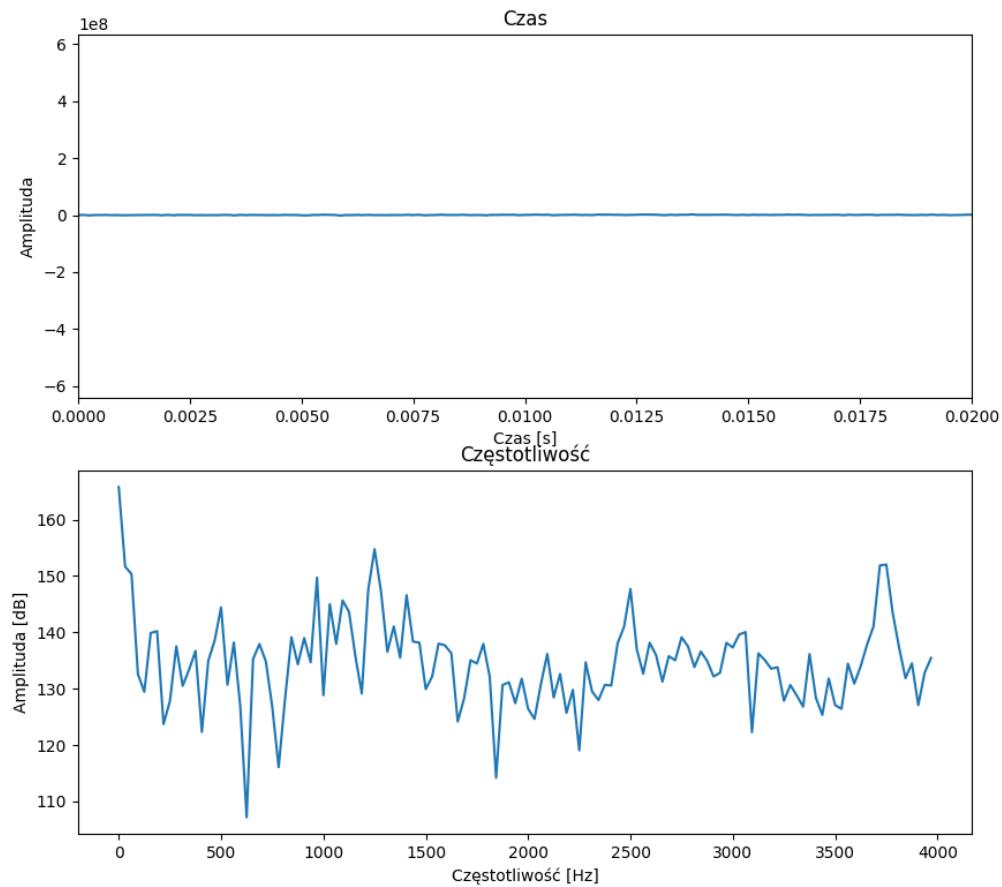
wartość losowa = [0.29277174]

Peak freq = 0.0

Peak amp = 166.33981694221

## Plik - SING/sing\_high1.wav

Decymacja, N 6



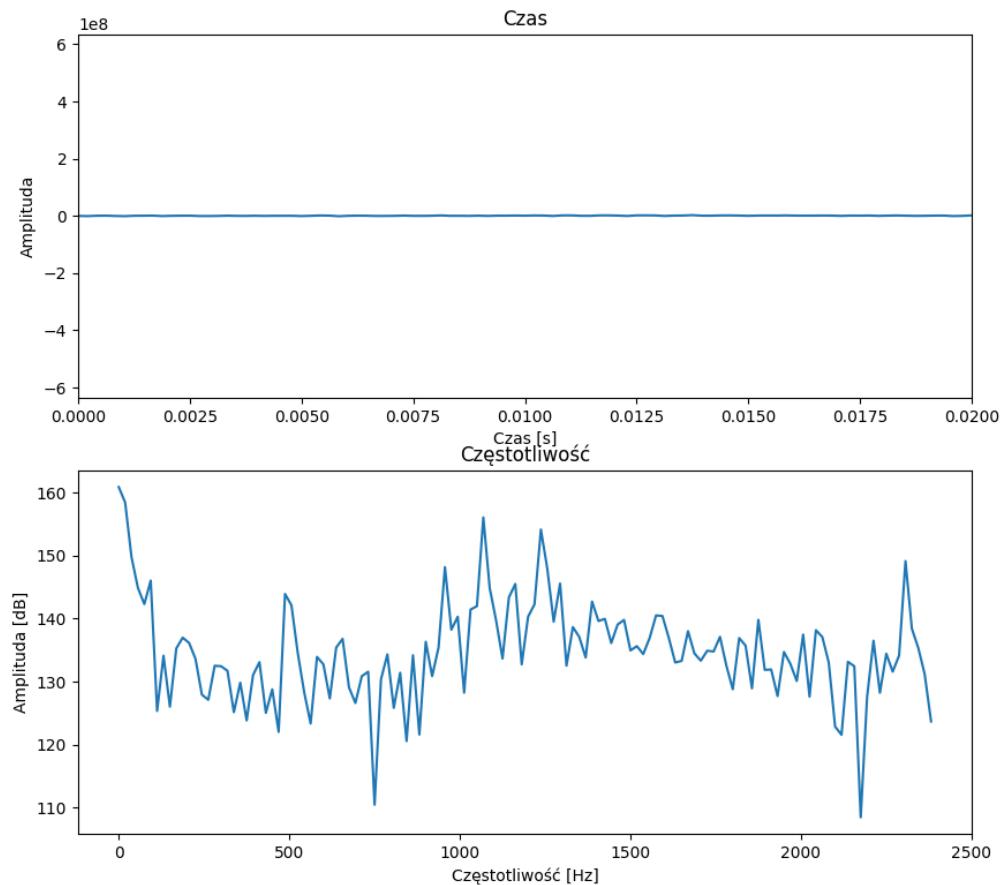
wartość losowa = [0.51317218]

Peak freq = 0.0

Peak amp = 165.78765176775656

**Plik - SING/sing\_high1.wav**

**Decymacja, N 10**



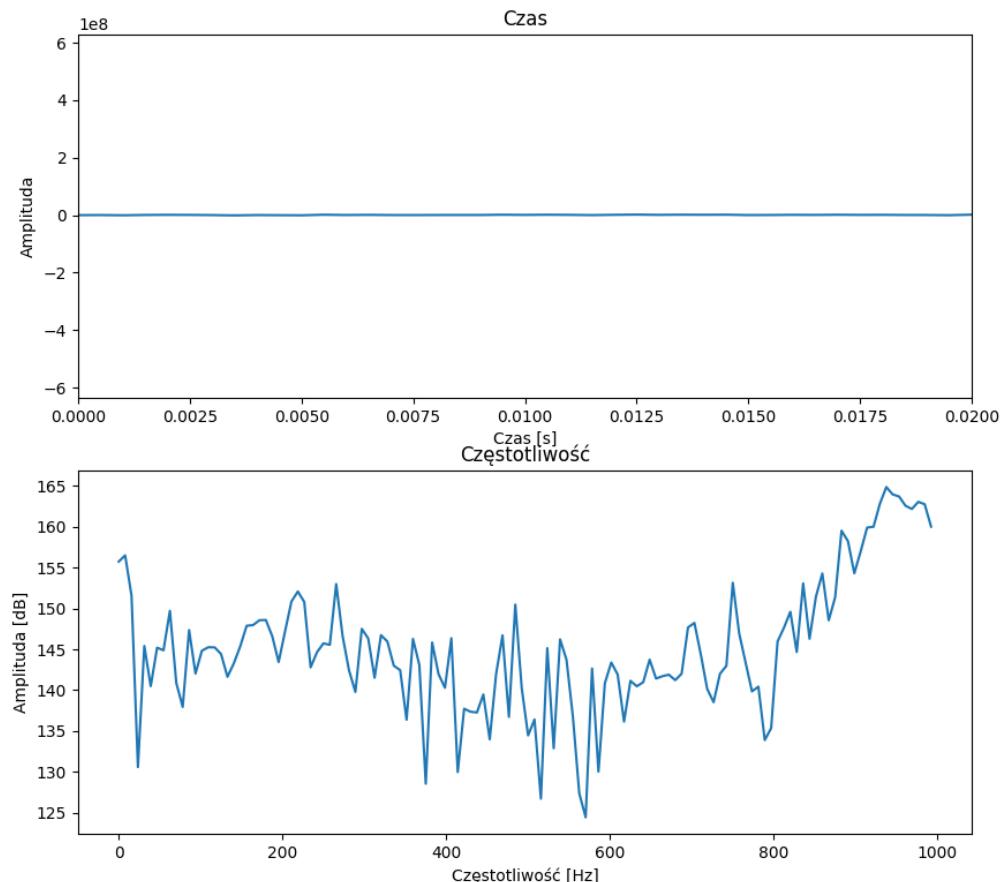
wartość losowa = [0.08522806]

Peak freq = 0.0

Peak amp = 160.90273789386197

**Plik - SING/sing\_high1.wav**

**Decymacja, N 24**



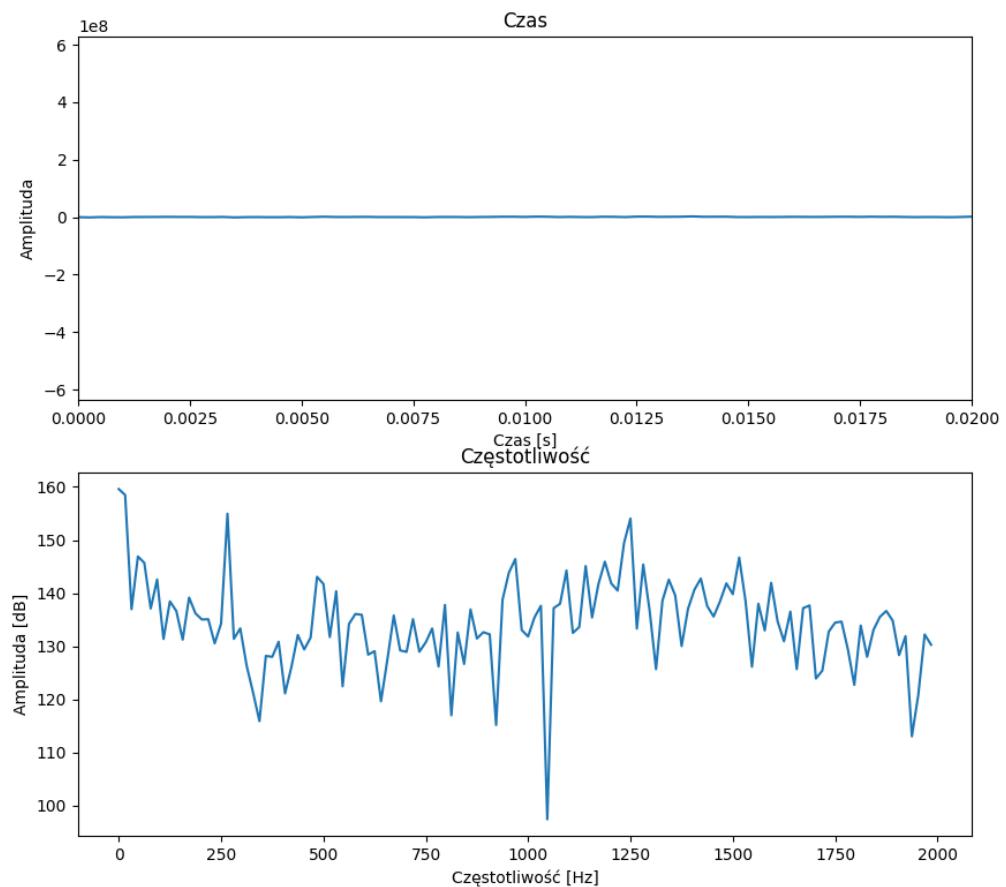
wartość losowa = [0.09019375]

Peak freq = 937.5

Peak amp = 164.84148741340766

Plik - SING/sing\_high1.wav

Interpolacja liniowa, Fs 4000



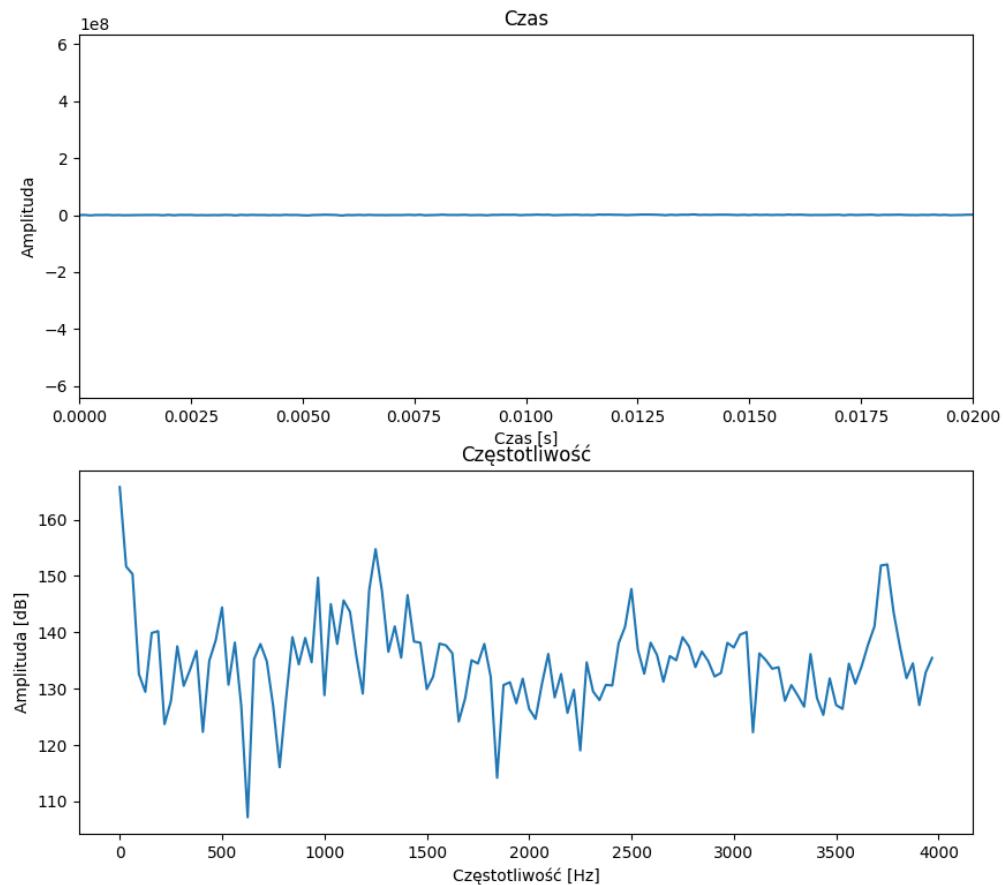
wartość losowa = [0.65739947]

Peak freq = 0.0

Peak amp = 159.59282623122363

Plik - SING/sing\_high1.wav

Interpolacja liniowa, Fs 8000



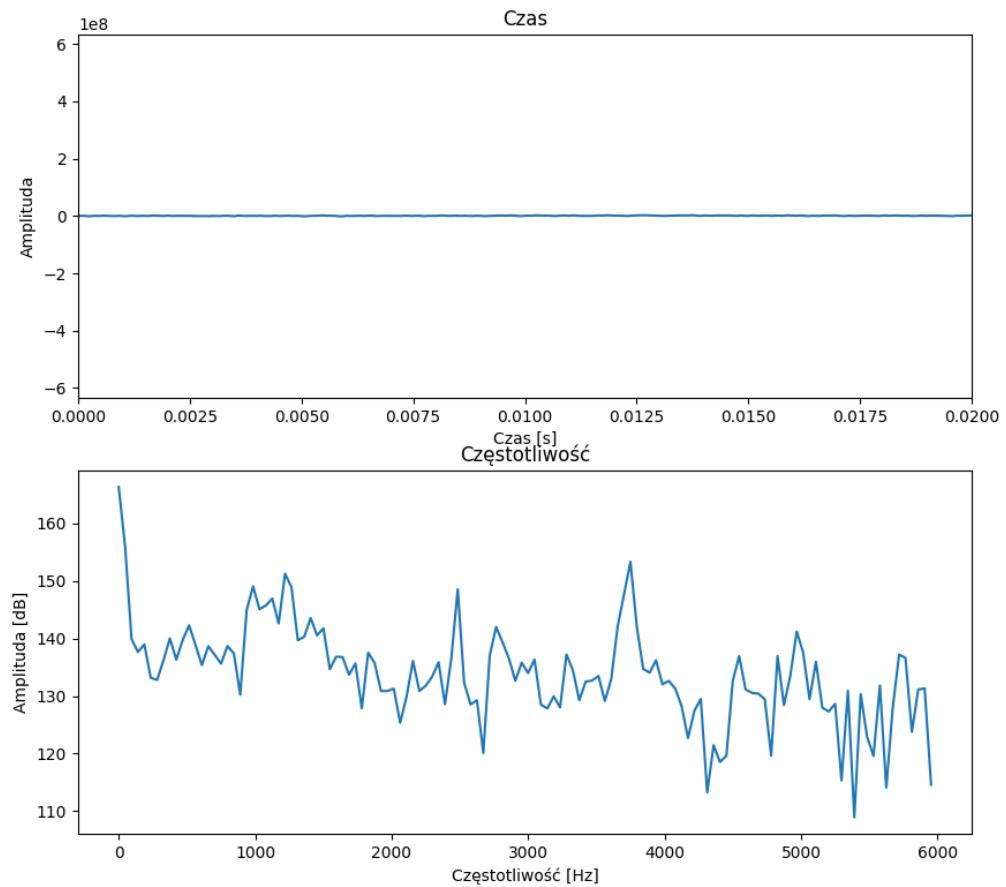
wartość losowa = [0.85143895]

Peak freq = 0.0

Peak amp = 165.78765176775656

Plik - SING/sing\_high1.wav

Interpolacja liniowa, Fs 11999



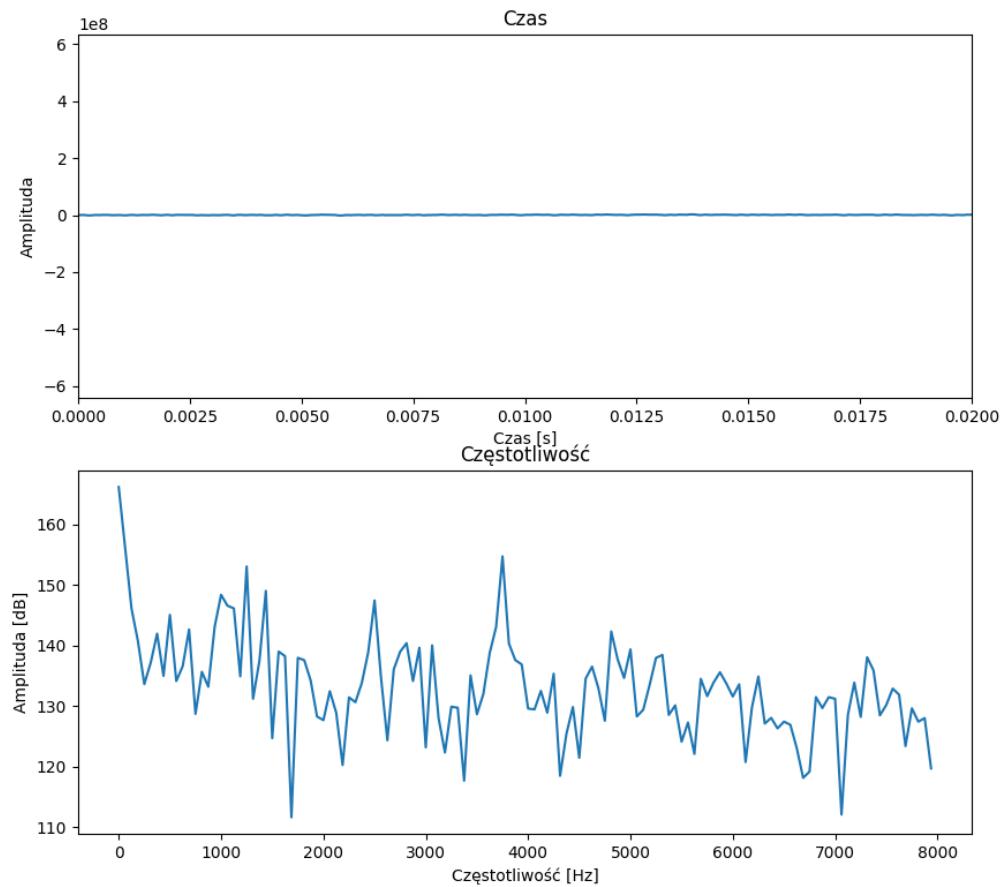
wartość losowa = [0.41419606]

Peak freq = 0.0

Peak amp = 166.33492168336124

Plik - SING/sing\_high1.wav

Interpolacja liniowa, Fs 16000



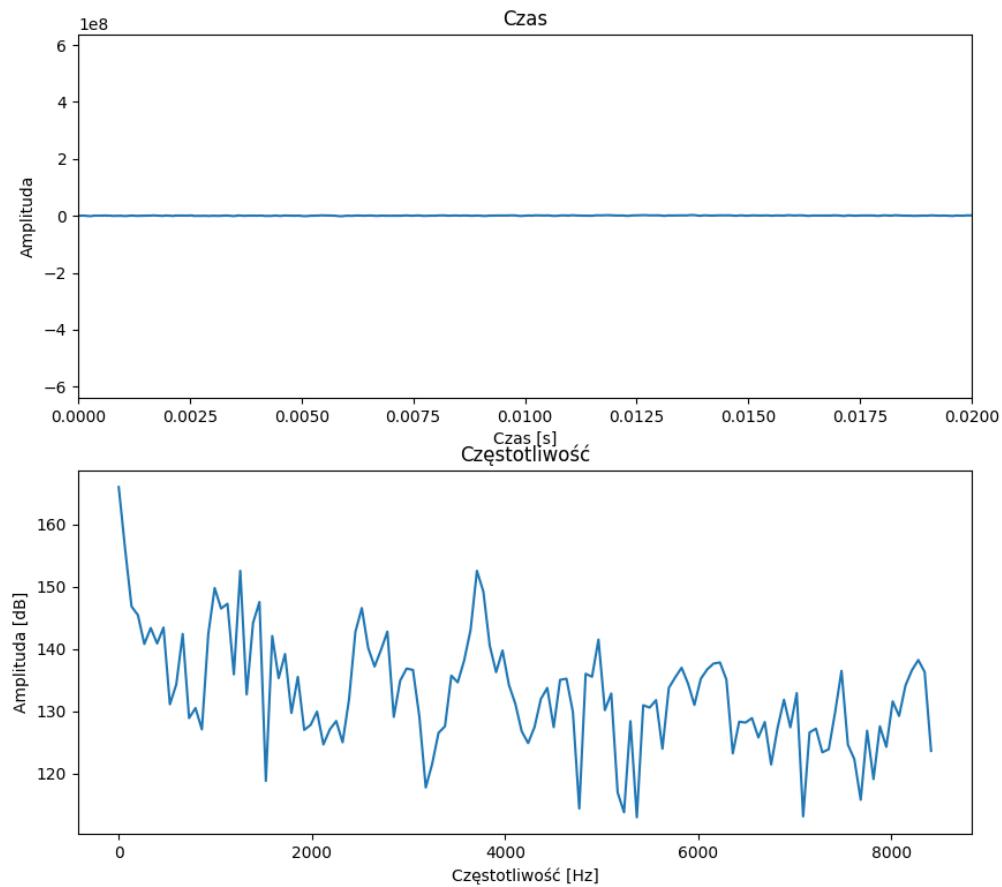
wartość losowa = [0.24599776]

Peak freq = 0.0

Peak amp = 166.19875975158703

Plik - SING/sing\_high1.wav

Interpolacja liniowa, Fs 16953



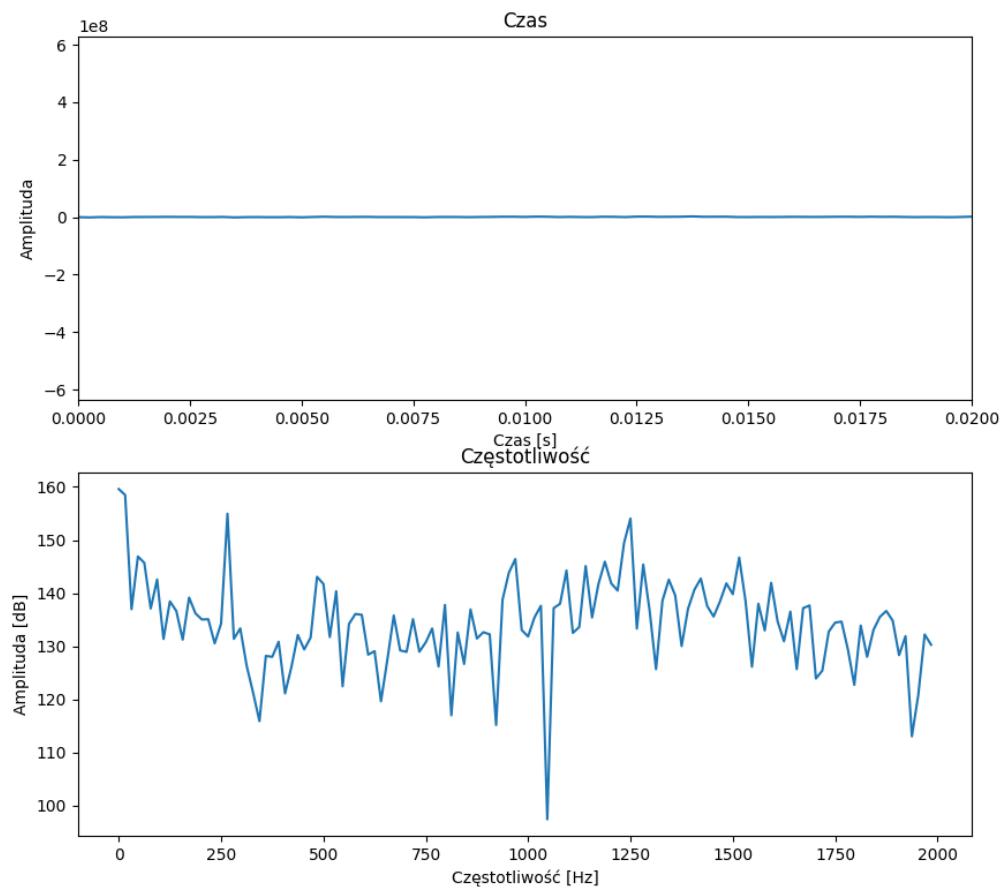
wartość losowa = [0.19006332]

Peak freq = 0.0

Peak amp = 165.95128659110804

Plik - SING/sing\_high1.wav

Interpolacja nieliniowa, Fs 4000



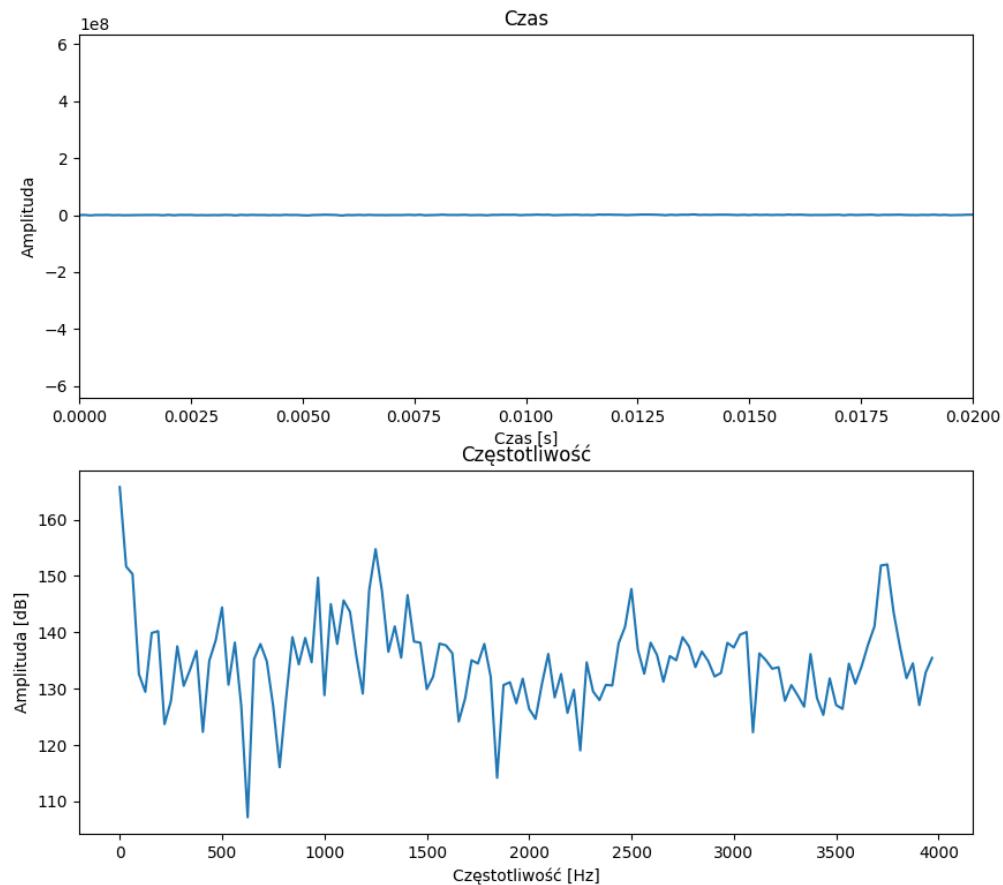
wartość losowa = [0.76359376]

Peak freq = 0.0

Peak amp = 159.59282623122363

Plik - SING/sing\_high1.wav

Interpolacja nieliniowa, Fs 8000



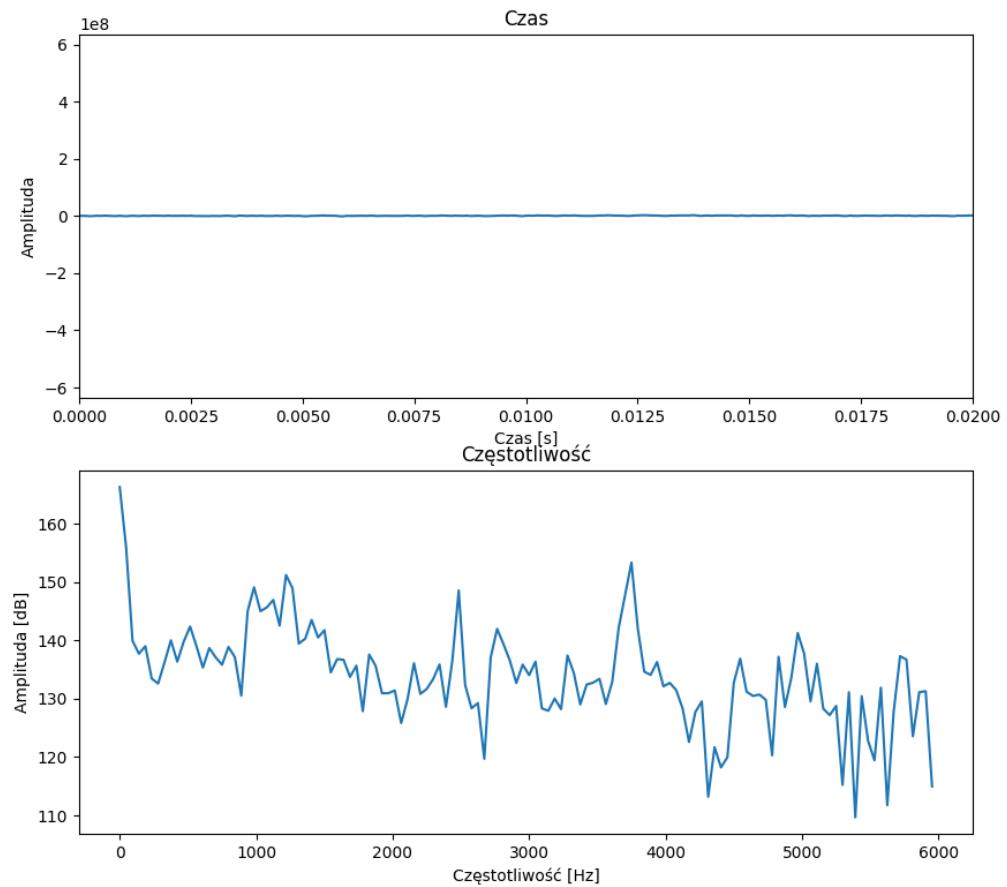
wartość losowa = [0.61877046]

Peak freq = 0.0

Peak amp = 165.78765176775656

**Plik - SING/sing\_high1.wav**

**Interpolacja nieliniowa, Fs 11999**



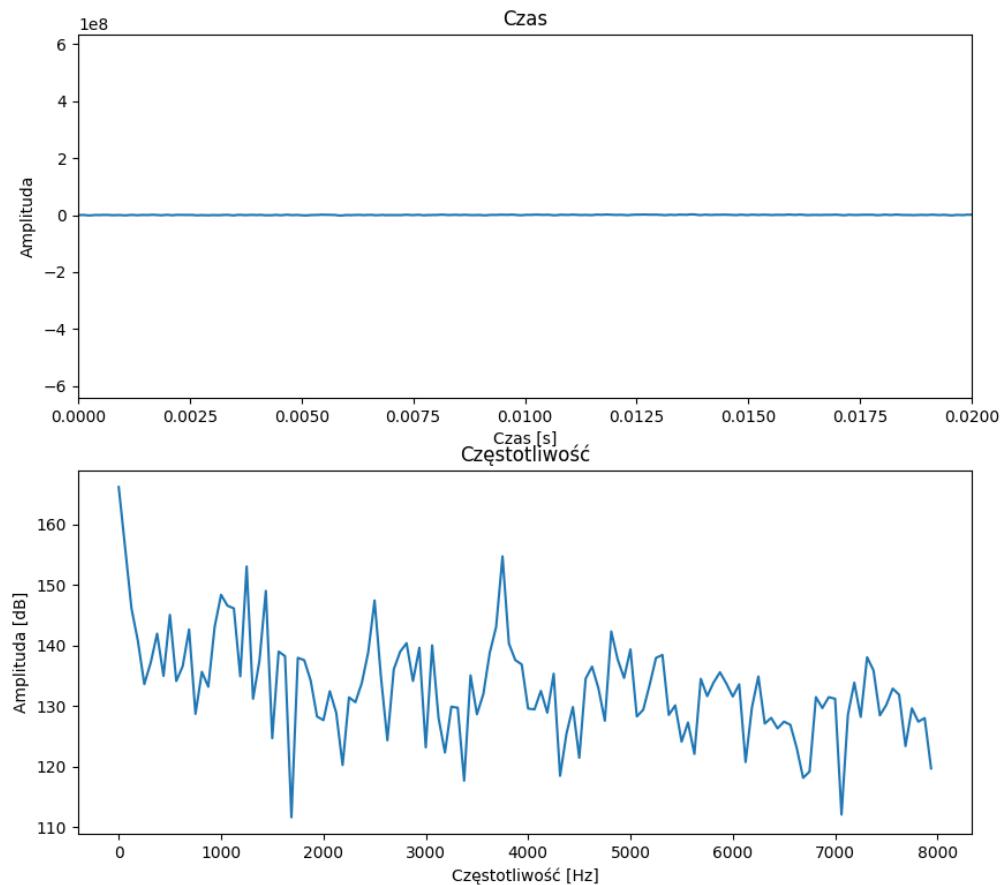
wartość losowa = [0.37279542]

Peak freq = 0.0

Peak amp = 166.33654517006426

Plik - SING/sing\_high1.wav

Interpolacja nieliniowa, Fs 16000



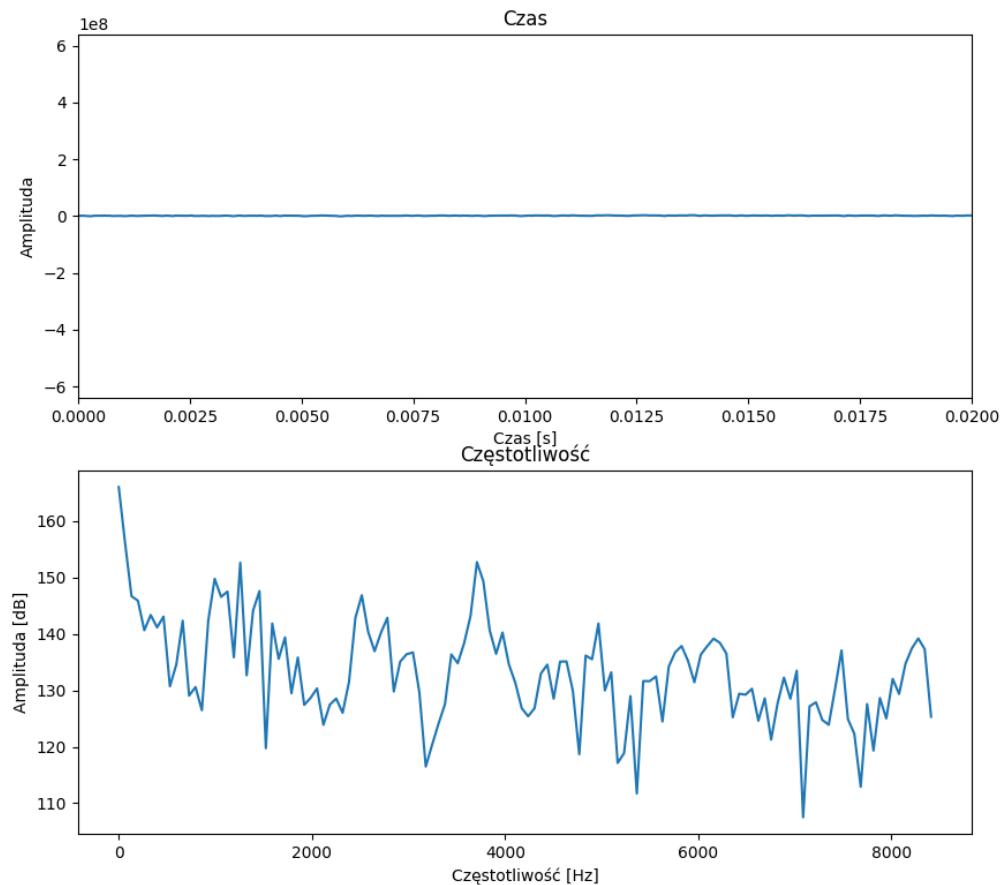
wartość losowa = [0.34274712]

Peak freq = 0.0

Peak amp = 166.19875975158703

**Plik - SING/sing\_high1.wav**

**Interpolacja nieliniowa, Fs 16953**



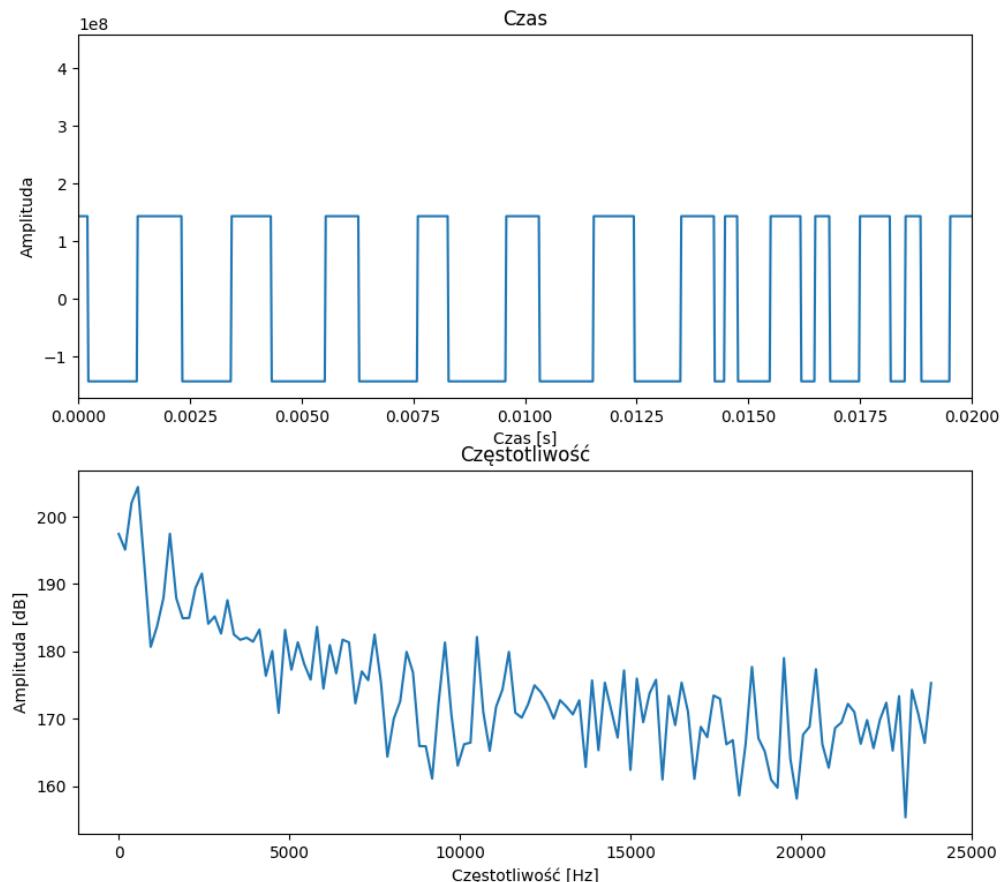
wartość losowa = [0.70177413]

Peak freq = 0.0

Peak amp = 165.96942629572376

**Plik - SING/sing\_medium1.wav**

**Kwantyzacja, Bit 4**



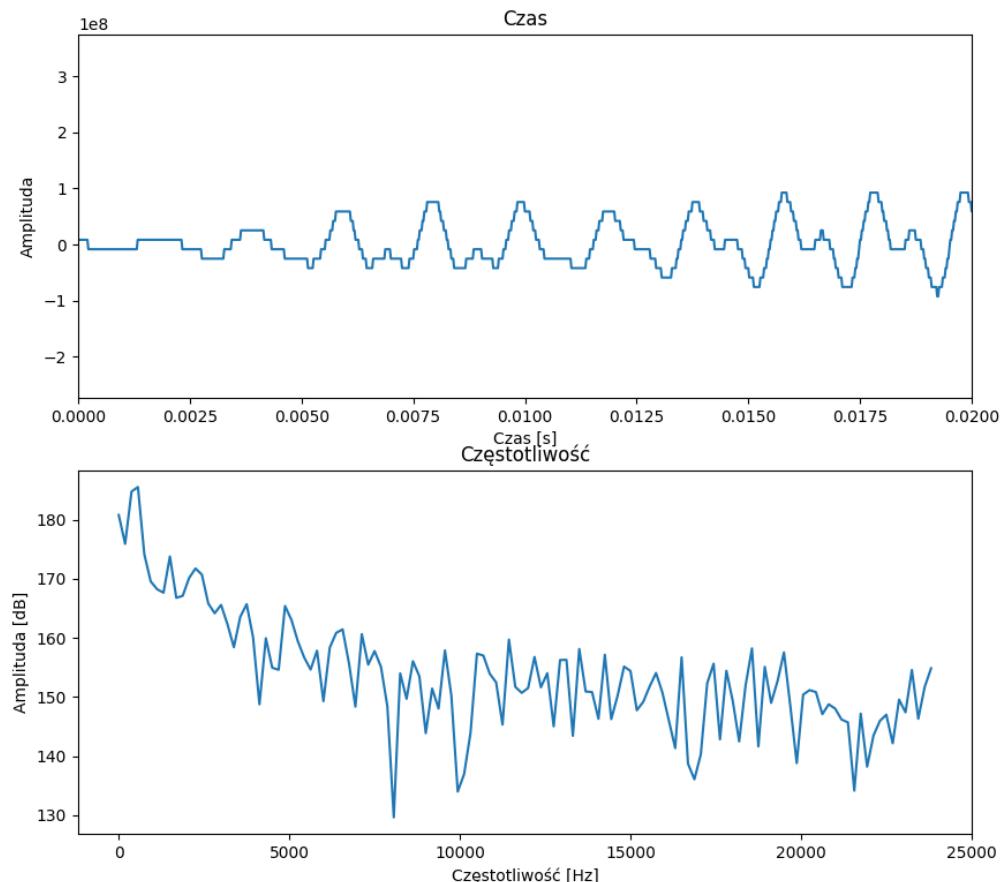
wartość losowa = [0.9899603]

Peak freq = 562.5

Peak amp = 204.40206565118143

## Plik - SING/sing\_medium1.wav

### Kwantyzacja, Bit 8



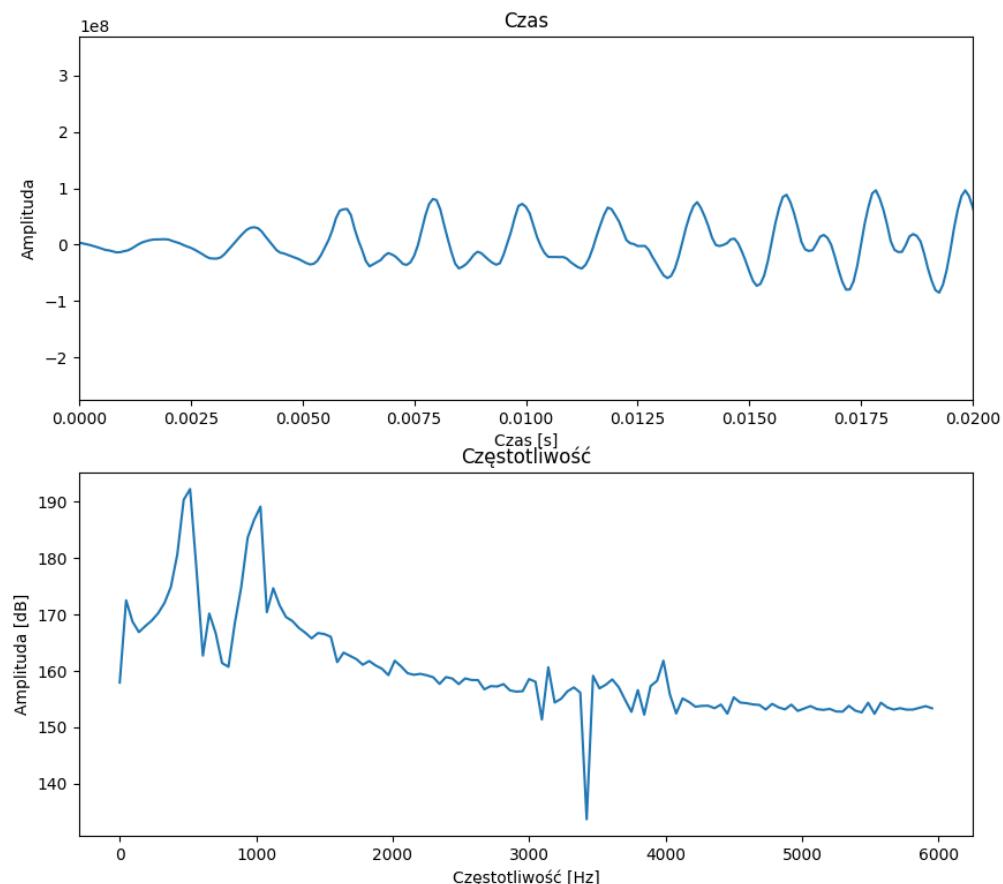
wartość losowa = [0.00533858]

Peak freq = 562.5

Peak amp = 185.5177254434712

Plik - SING/sing\_medium1.wav

Decymacja, N 4



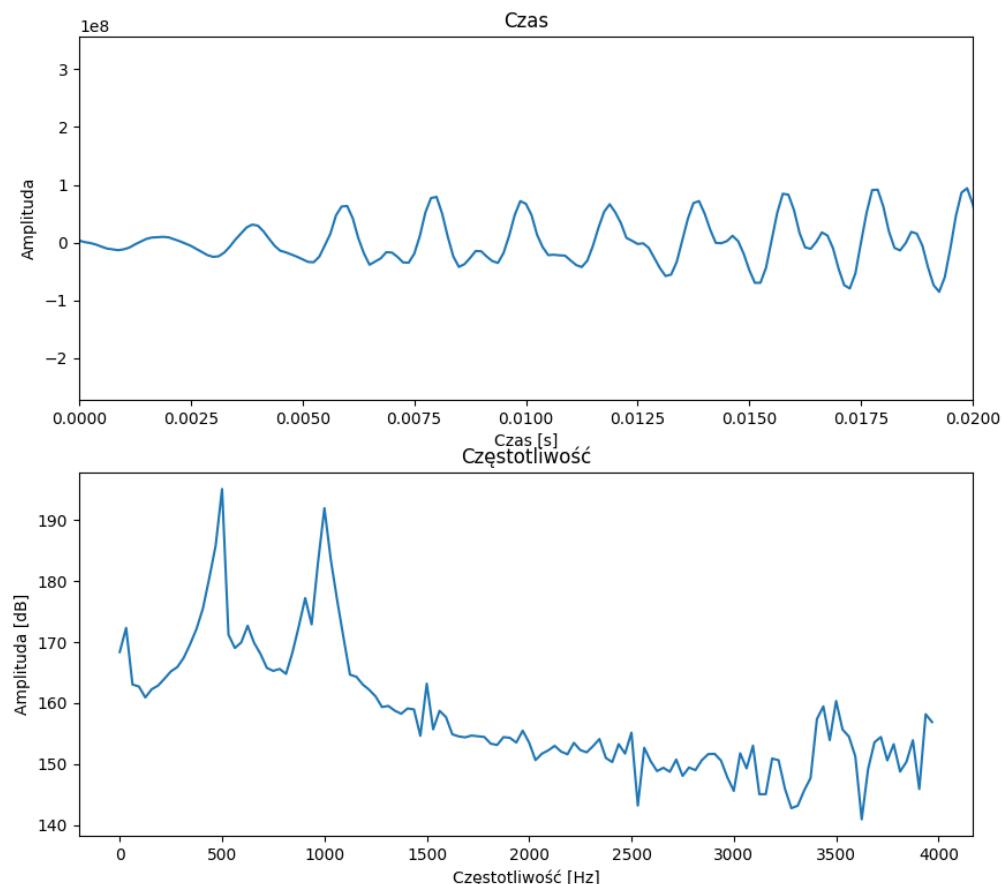
wartość losowa = [0.71455361]

Peak freq = 515.625

Peak amp = 192.26979812590778

**Plik - SING/sing\_medium1.wav**

**Decymacja, N 6**



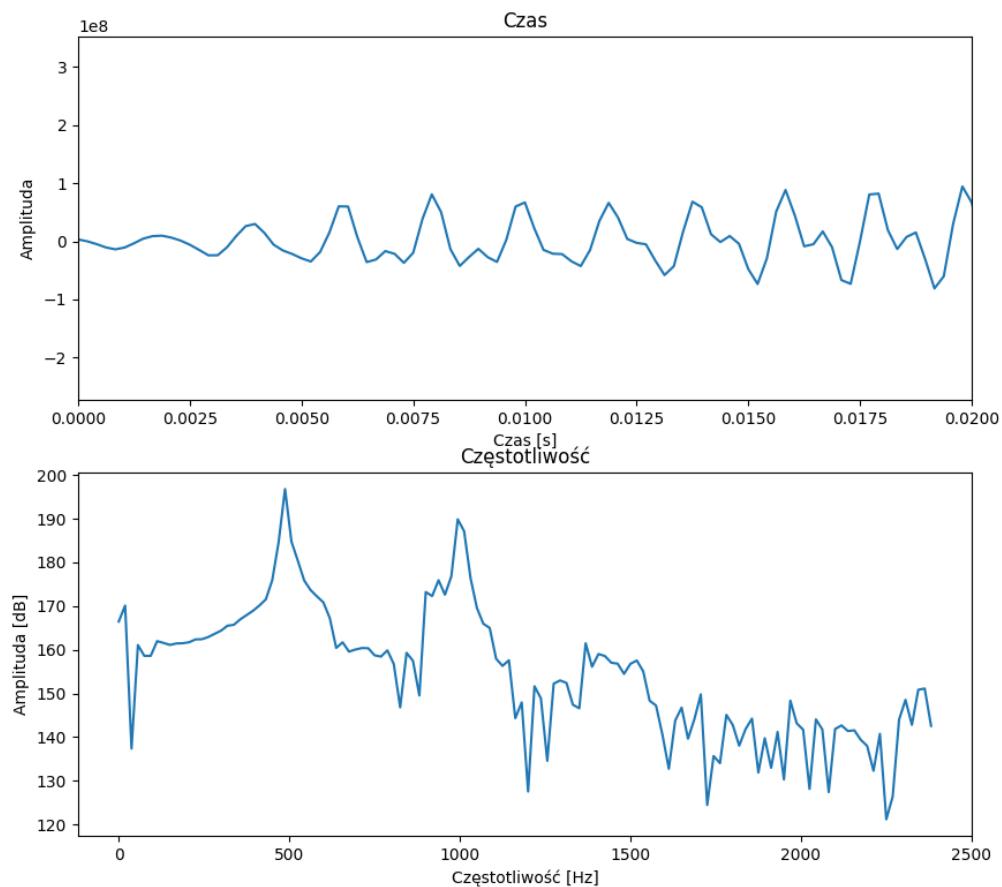
wartość losowa = [0.65008591]

Peak freq = 500.0

Peak amp = 195.1199970581446

**Plik - SING/sing\_medium1.wav**

**Decymacja, N 10**



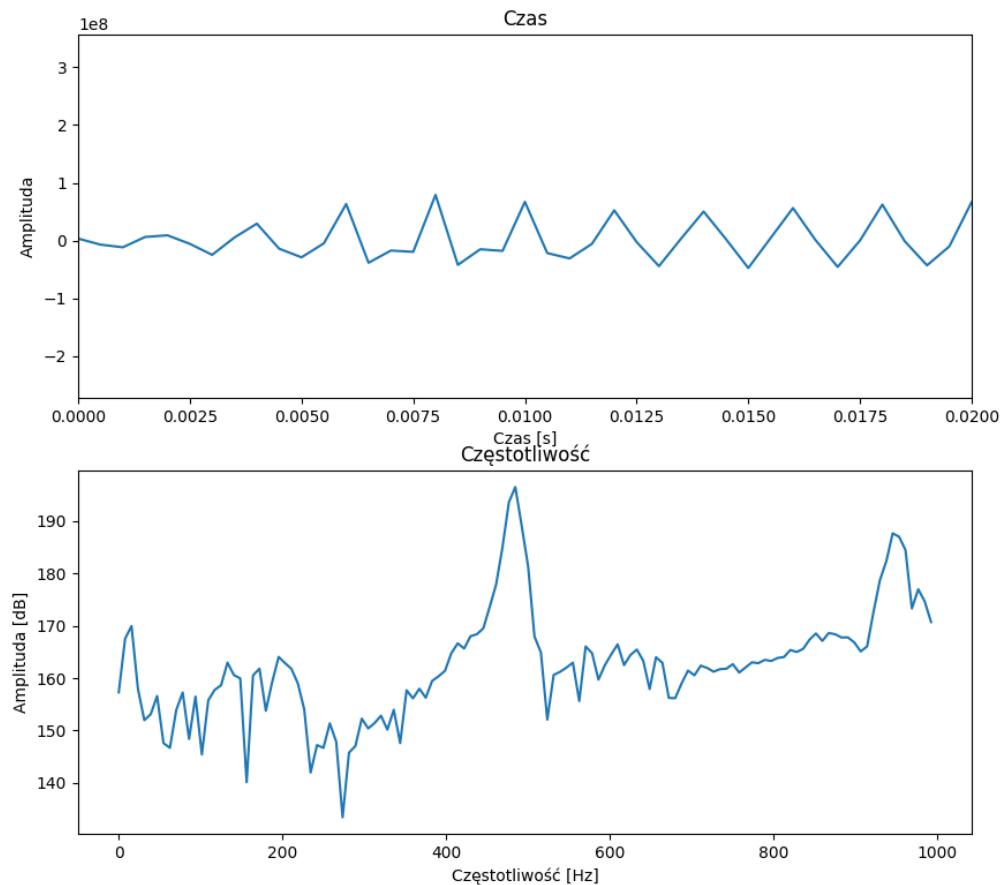
wartość losowa = [0.11818288]

Peak freq = 487.5

Peak amp = 196.79038950589438

**Plik - SING/sing\_medium1.wav**

**Decymacja, N 24**



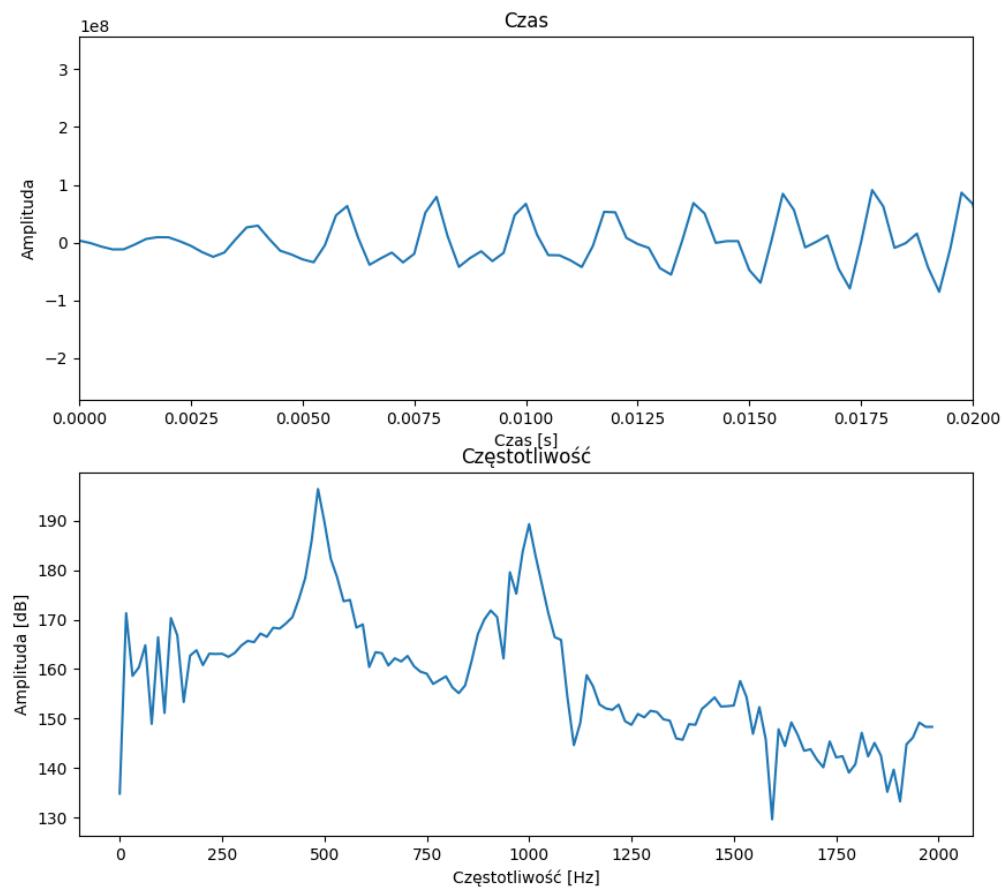
wartość losowa = [0.19359857]

Peak freq = 484.375

Peak amp = 196.45568844929528

Plik - SING/sing\_medium1.wav

Interpolacja liniowa, Fs 4000



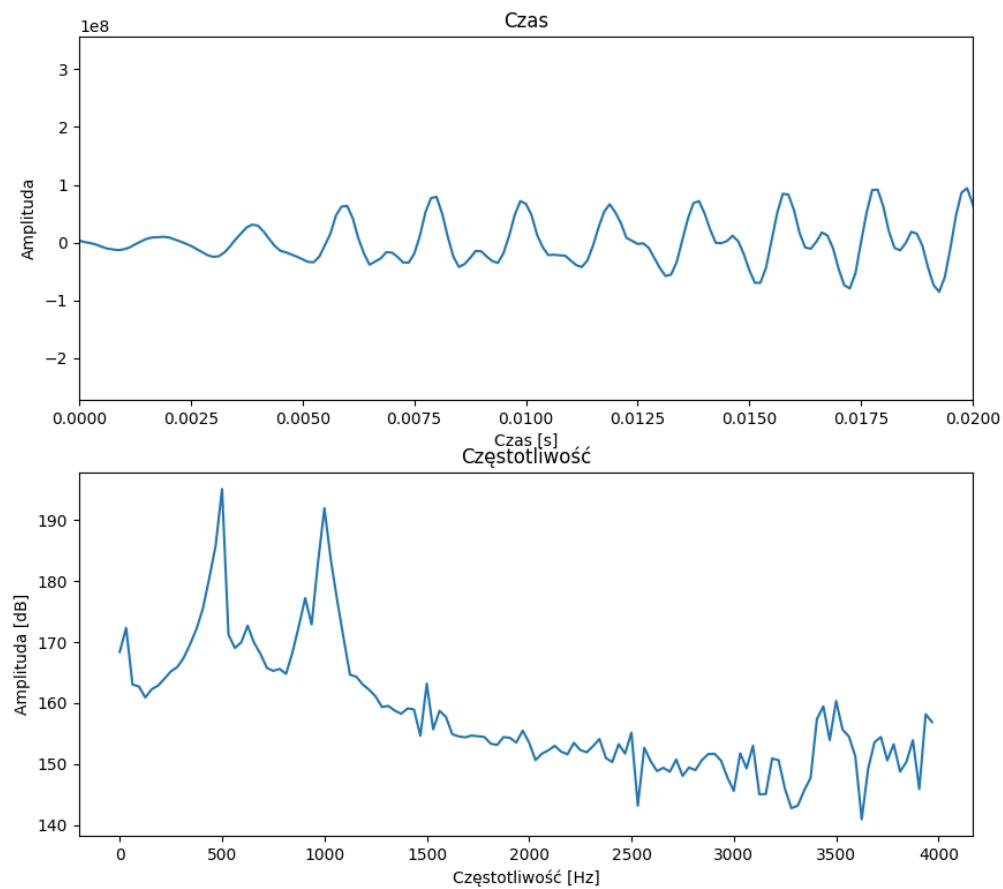
wartość losowa = [0.43492327]

Peak freq = 484.375

Peak amp = 196.39590660559176

Plik - SING/sing\_medium1.wav

Interpolacja liniowa, Fs 8000



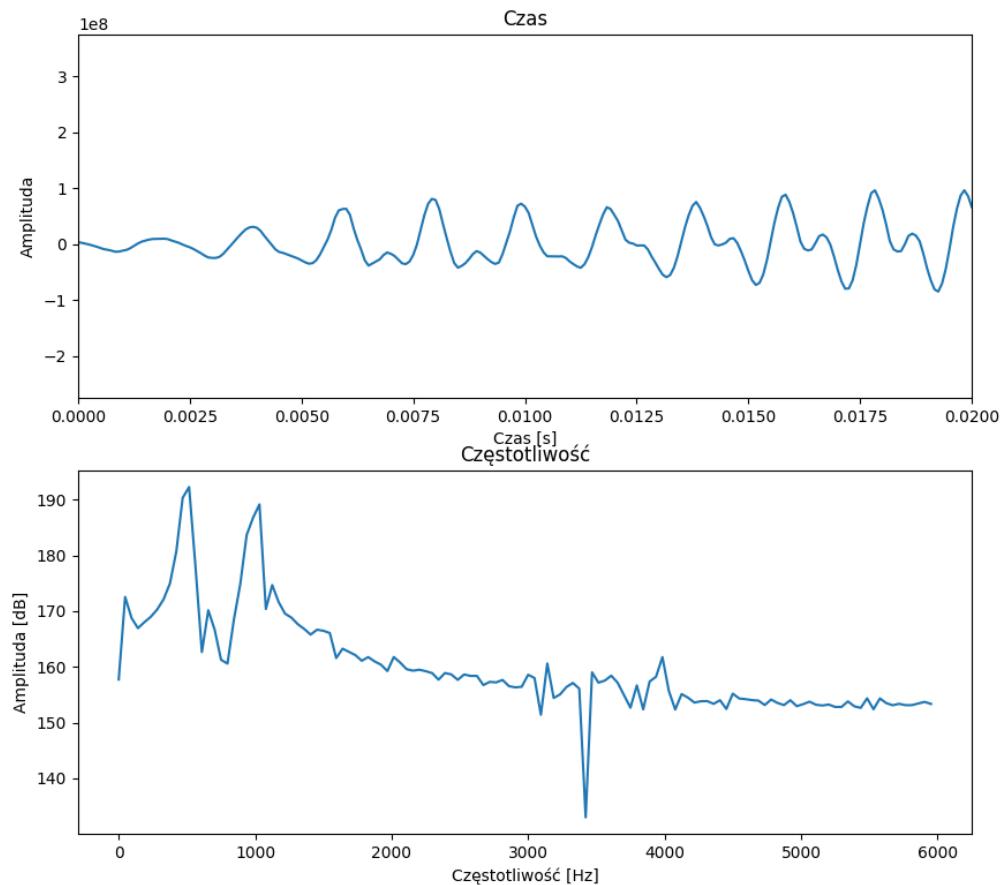
wartość losowa = [0.85096179]

Peak freq = 500.0

Peak amp = 195.1199970581446

Plik - SING/sing\_medium1.wav

Interpolacja liniowa, Fs 11999



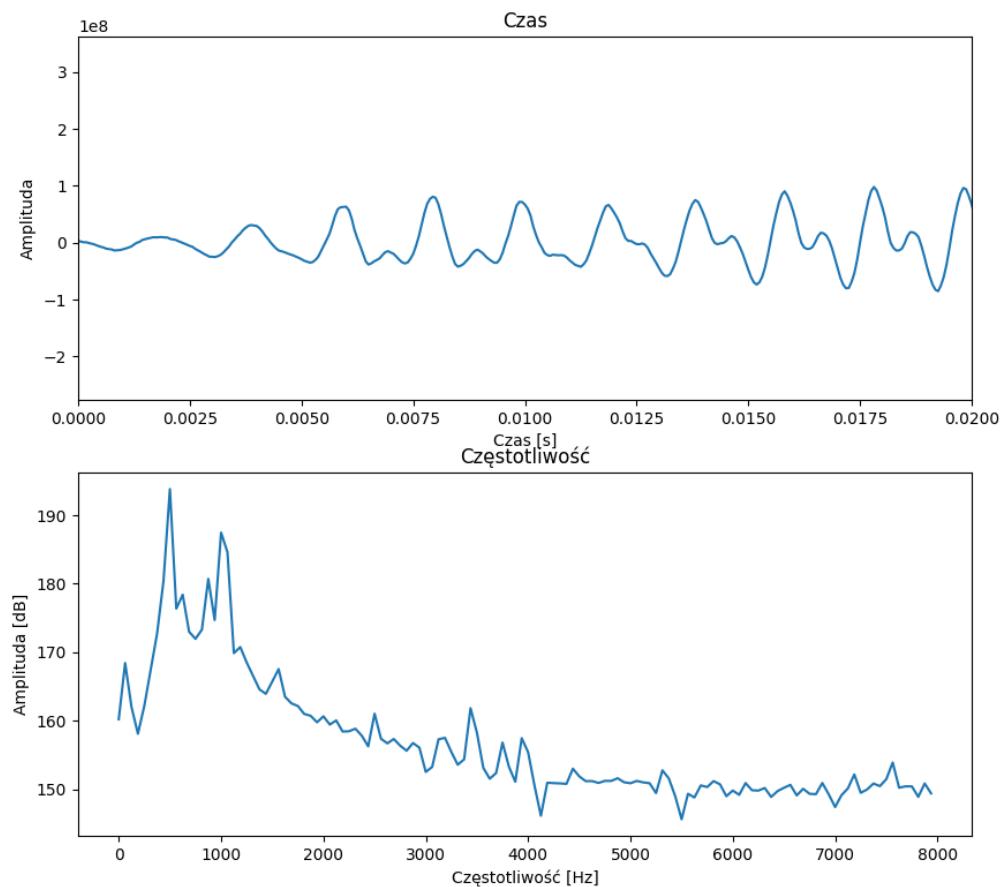
wartość losowa = [0.10763692]

Peak freq = 515.58203125

Peak amp = 192.27654013619895

Plik - SING/sing\_medium1.wav

Interpolacja liniowa, Fs 16000



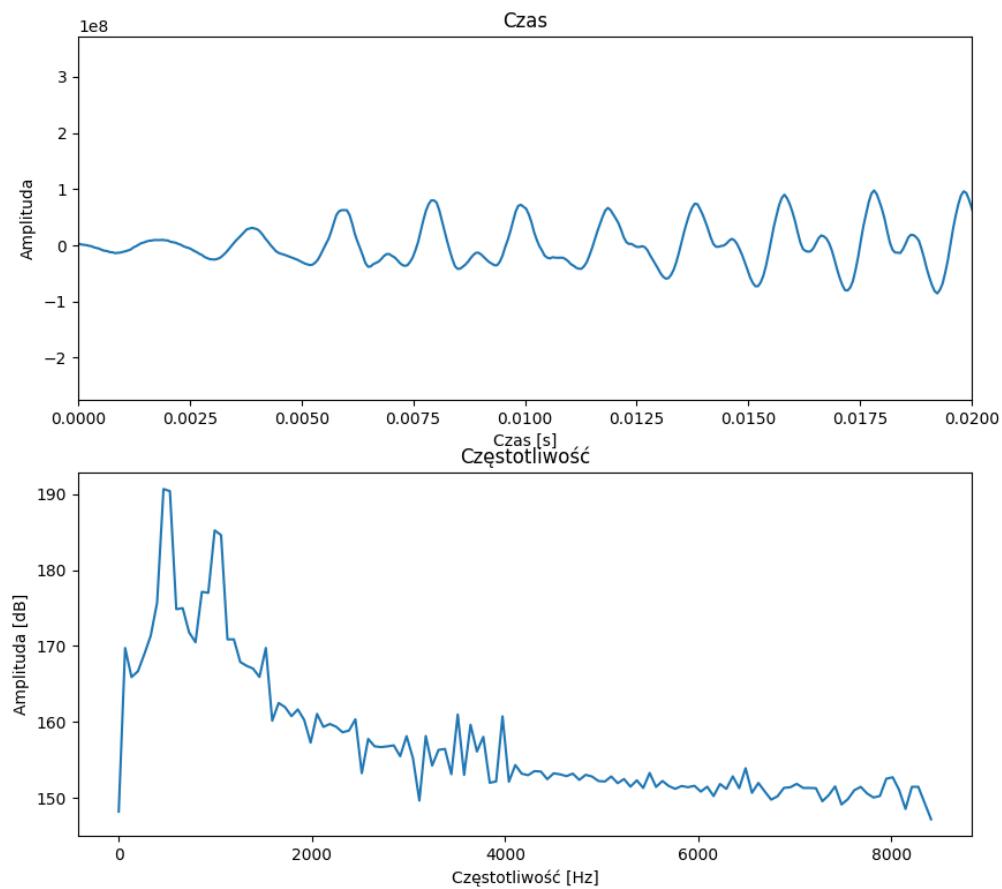
wartość losowa = [0.85652959]

Peak freq = 500.0

Peak amp = 193.81954227342698

Plik - SING/sing\_medium1.wav

Interpolacja liniowa, Fs 16953



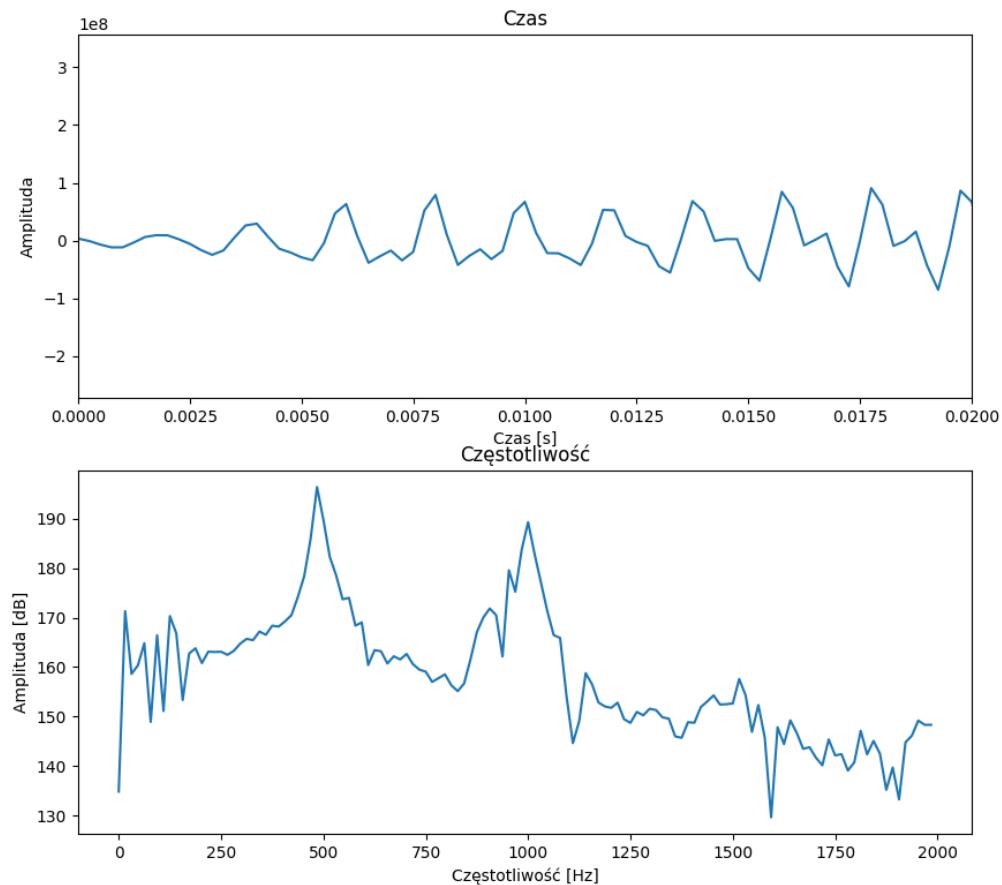
wartość losowa = [0.12329607]

Peak freq = 463.55859375

Peak amp = 190.65235456688845

Plik - SING/sing\_medium1.wav

Interpolacja nieliniowa, Fs 4000



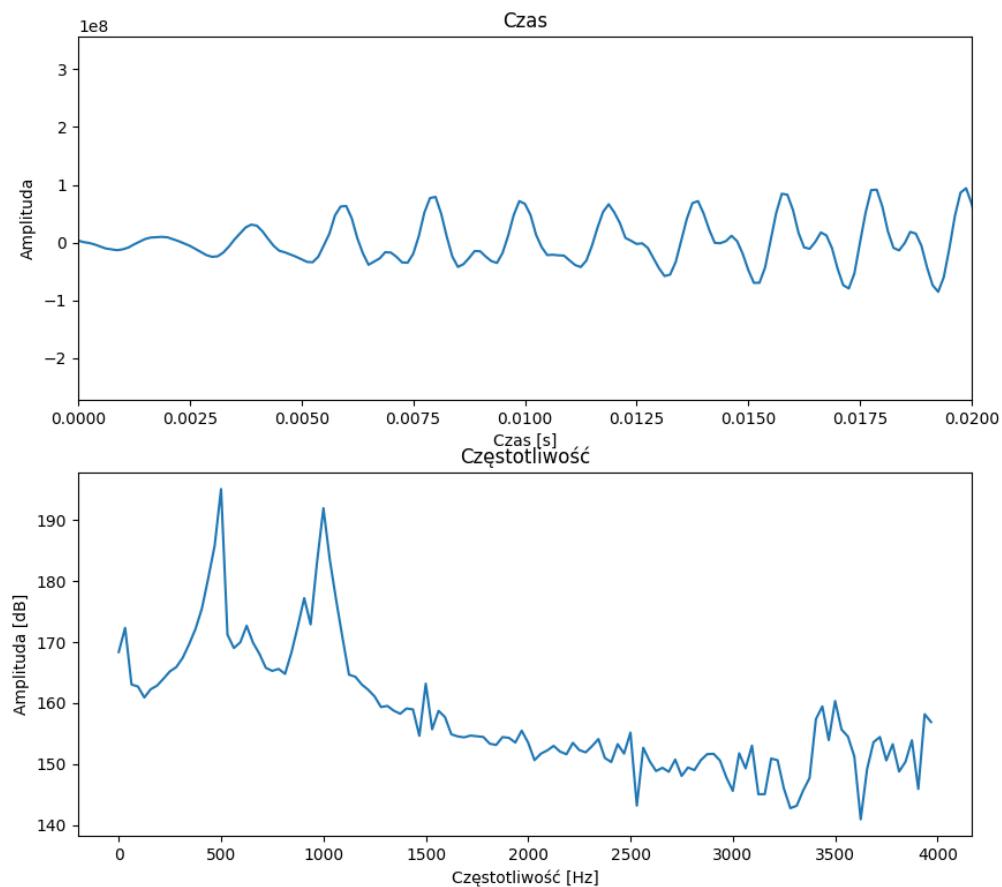
wartość losowa = [0.21760758]

Peak freq = 484.375

Peak amp = 196.39590660559176

Plik - SING/sing\_medium1.wav

Interpolacja nieliniowa, Fs 8000



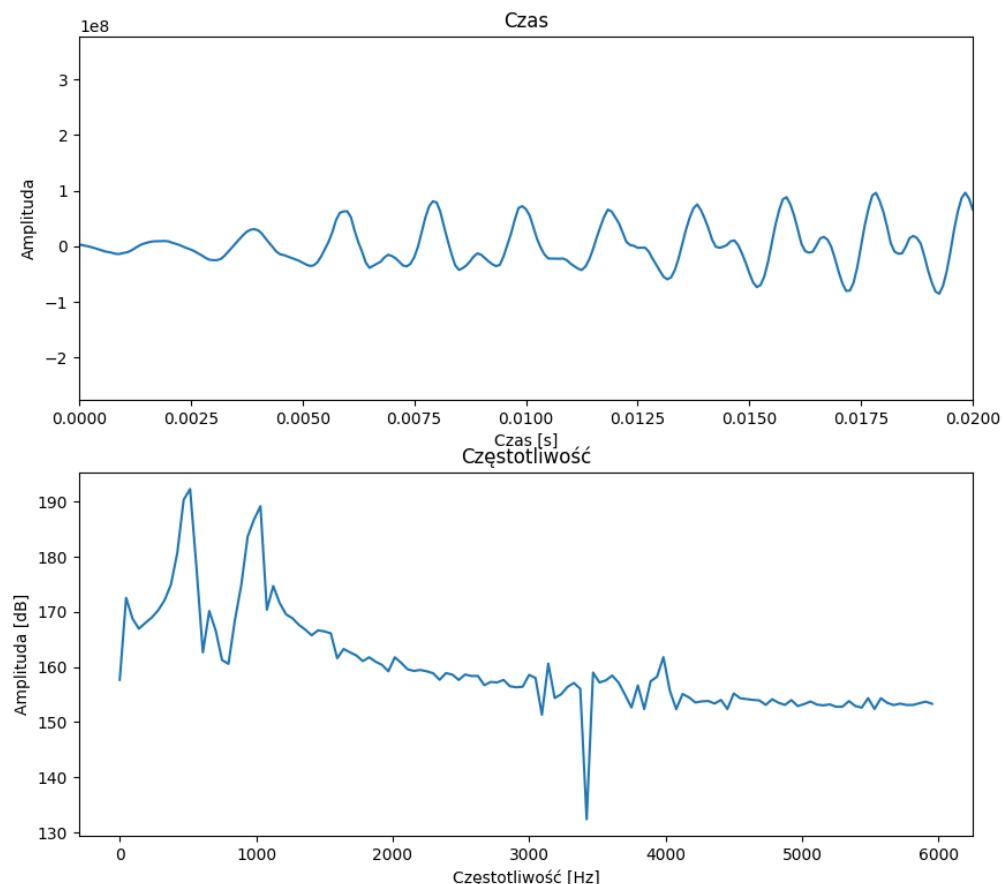
wartość losowa = [0.8013067]

Peak freq = 500.0

Peak amp = 195.1199970581446

Plik - SING/sing\_medium1.wav

Interpolacja nieliniowa, Fs 11999



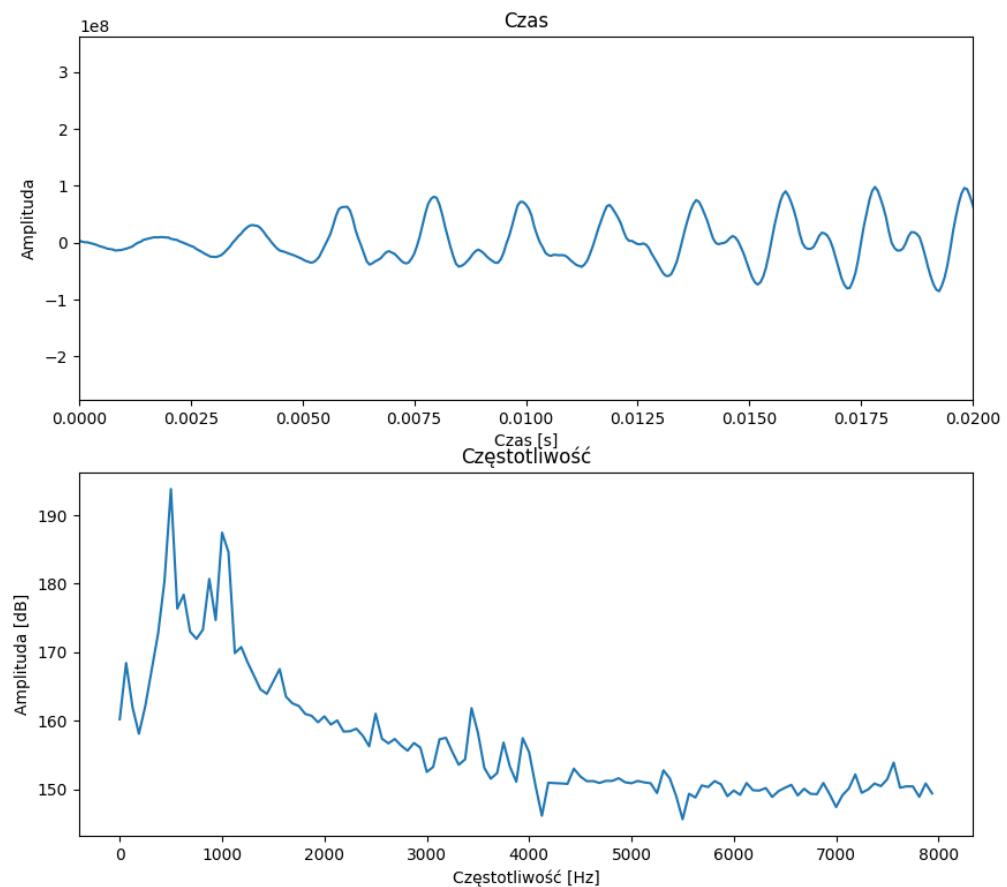
wartość losowa = [0.59850827]

Peak freq = 515.58203125

Peak amp = 192.27730456342223

Plik - SING/sing\_medium1.wav

Interpolacja nieliniowa, Fs 16000



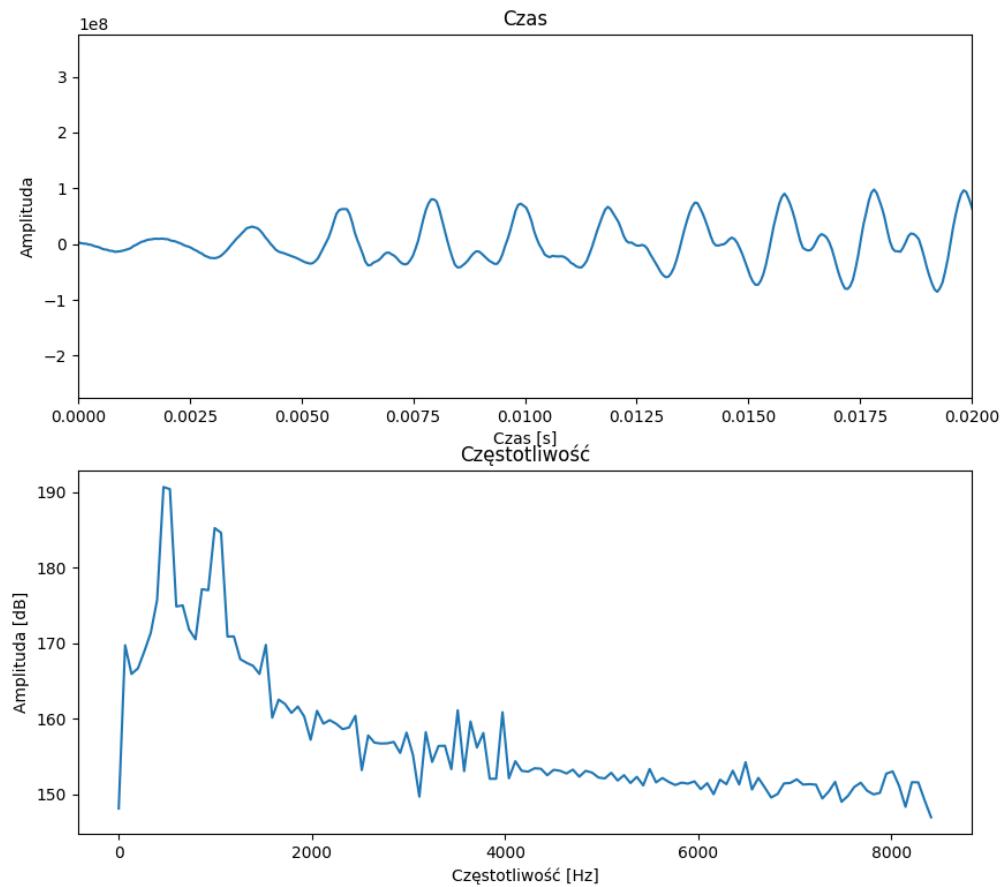
wartość losowa = [0.8136572]

Peak freq = 500.0

Peak amp = 193.81954227342698

Plik - SING/sing\_medium1.wav

Interpolacja nieliniowa, Fs 16953



wartość losowa = [0.2224078]

Peak freq = 463.55859375

Peak amp = 190.65416401490705

## Wnioski:

W przypadku zmiany rozdzielczości bitowej, zauważalne jest, że im mniejsza liczba bitów, tym większe zniekształcenia w dźwięku, co jest zgodne z oczekiwaniami, gdyż mniejsza liczba bitów oznacza mniejszy zakres wartości, co prowadzi do większej utraty informacji. Podobnie, przy decymacji można zauważać zmniejszenie jakości dźwięku, szczególnie w przypadku większych wartości interwału n.

Interpolacja sygnału, zarówno liniowa, jak i nieliniowa. Warto zauważać, że przy zwiększaniu częstotliwości próbkowania dźwięk staje się bardziej szczegółowy, jednakże należy unikać zbyt dużego zwiększania tej wartości, gdyż może to prowadzić do nadmiernego zużycia zasobów oraz niepotrzebnie dużego rozmiaru pliku.

## Po przesłuchaniu dźwięków:

- Przy kwantyzacji jeśli jest wykonywana na malej liczbie bitów to dźwięk jest zniekształcony i pogłośniony im więcej bitów tym lepszy jest dźwięk i bardziej wyraźny. Nie zależy to od wysokości dźwięku.
- Przy decymacji dla kroków 4 jest najlepiej i później z podwyższaniem kroków dźwięk coraz bardziej się zniekształca i jest taki „antenowy” dźwięk w tle który co krok jest coraz głośniejszy.
- Przy interpolacji liniowej dźwięk przy 4000Hz jest stłumiony im większa częstotliwość próbkowania tym coraz głośniejszy jest dźwięk ale nie jest już stłumiony lecz dalej nie wyraźny. Bardzo podobnie wychodzi przy interpolacji nieliniowej.