



FM hangszintézis megvalósítása

Tanszék: Méréstechnika és Információs rendszerek tanszék
Tantárgy: Önálló Laboratórium
Konzulens: Bank Balázs
Név: Makovecz Ádám
Neptun-kód: T7IA35

Virtual Studio Technology

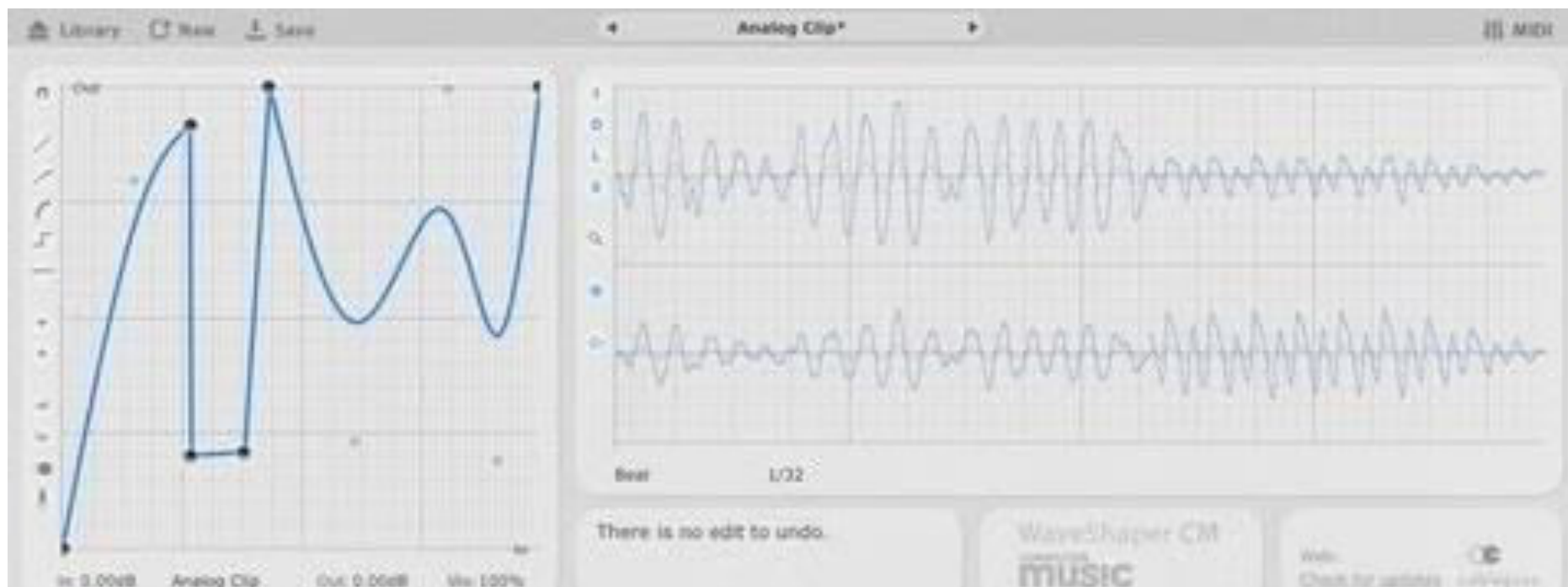
- Virtuális hangszerek, hatások (effektek) létrehozására használható.
- VST hostok: -Ableton
-Cubase
-Fruity Loops
-Logic

Sampling és Wavetable

The image displays the MASSIVE synthesizer interface, a software instrument used for creating electronic music. The interface is divided into several sections:

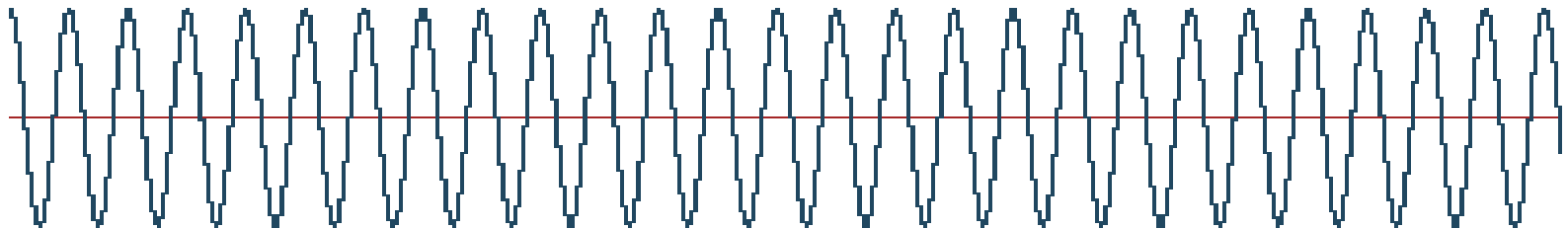
- Top Bar:** Shows the project name "ASTRAL_LFO_BASS_3", CPU usage at 3%, and various menu options like File, Save, and View.
- Oscillators (OSC1-3):** Each oscillator has controls for Pitch, Wt-position, Intensity, and Amp. OSC1 is set to "Kanga" and OSC2 to "AddOct".
- Filters (FILTER 1-2):** Filter 1 is set to "Scream" and Filter 2 to "Daft". Both have Cutoff and Resonance controls.
- AMP and BYPASS:** The AMP section includes Amp Mod, Pan, and Byp Mod controls. The BYPASS section has a Byp Mod knob.
- MODULATION OSC:** Controls for Pitch, RM, Mode, and Oscillator, with Ring Mod, Phase, and Position options.
- GLOBAL:** A central control area for parameters like Global tune, Preset BPM, and various quality settings (Ultra, High, Eco).
- INSERT 1-2:** Controls for P Shaper and Bitcrush, including Dry/Wet and Drive parameters.
- MACRO CONTROL:** A section with buttons for KTr, Vel, AT, TrR, and a grid of macro knobs for Grit, Air, HAOS, and others.

Waveshaping

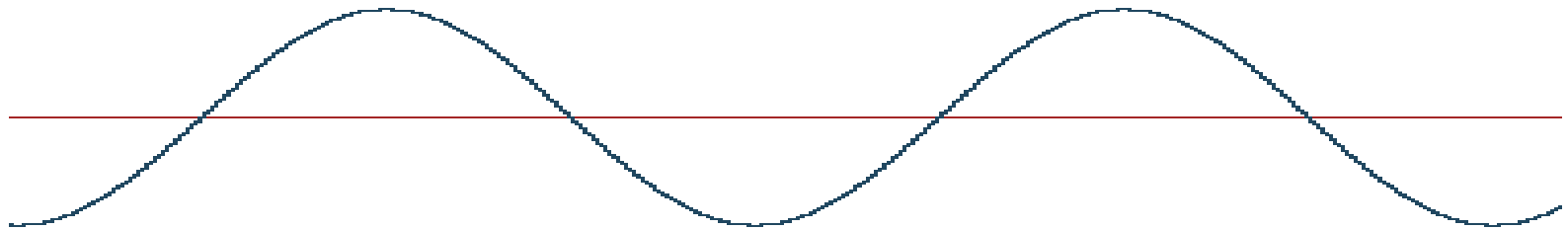


FM technológia

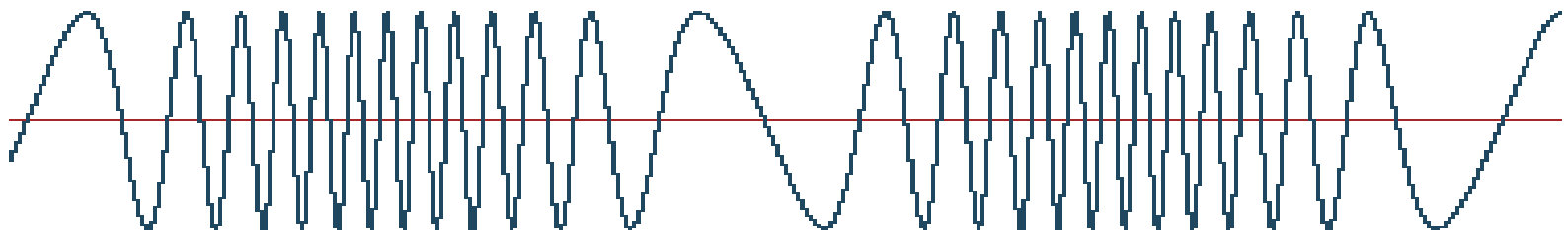
Carrier



Modulating Wave



Modulated Result



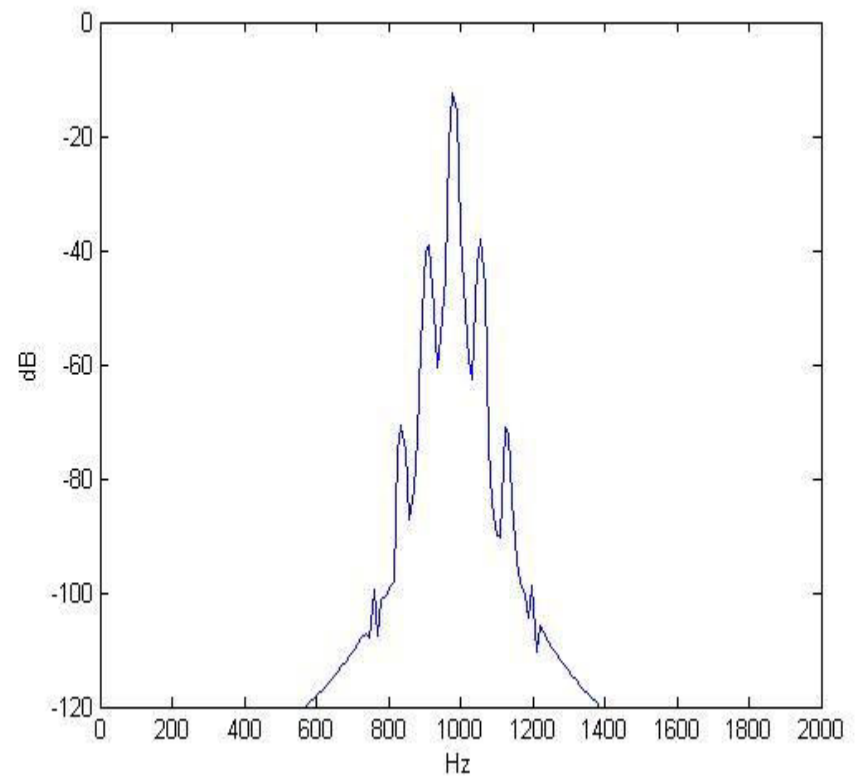
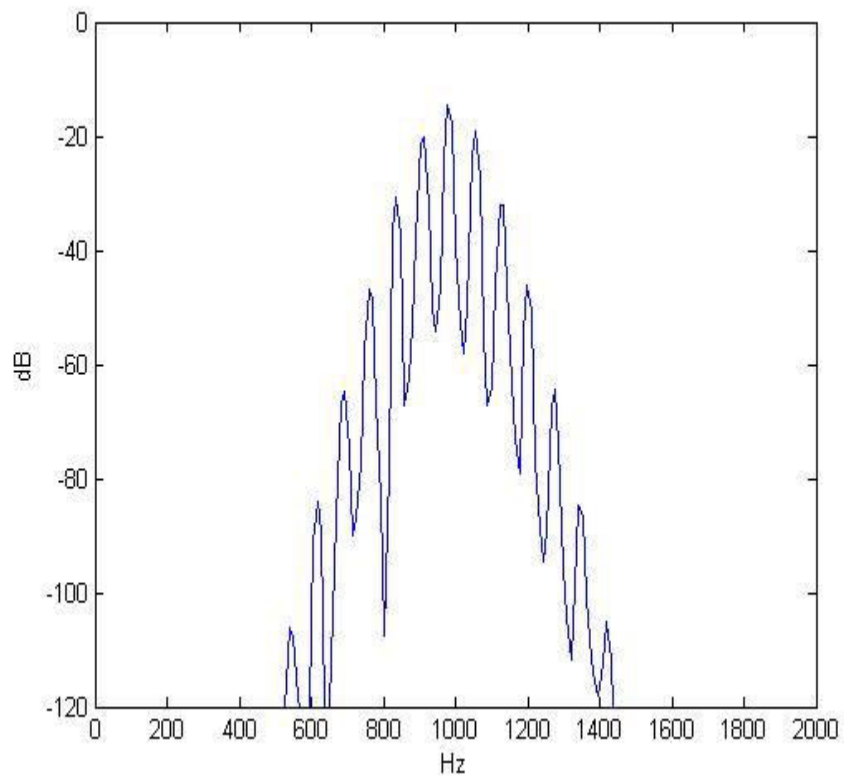
FM hangszintézis

- John Chowning
- FM és PM

$$\text{PM : } y(t) = A_c \sin(\omega_c t + m(t) + \phi_c) .$$

$$\text{FM : } \quad = A_c \cos\left(2\pi \int_0^t [f_c + f_\Delta x_m(\tau)] d\tau\right)$$

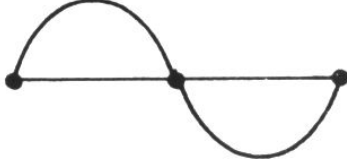




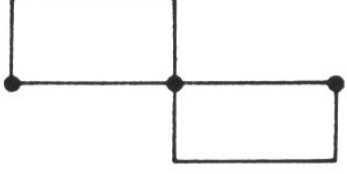

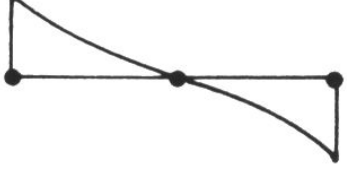
PM spektrum



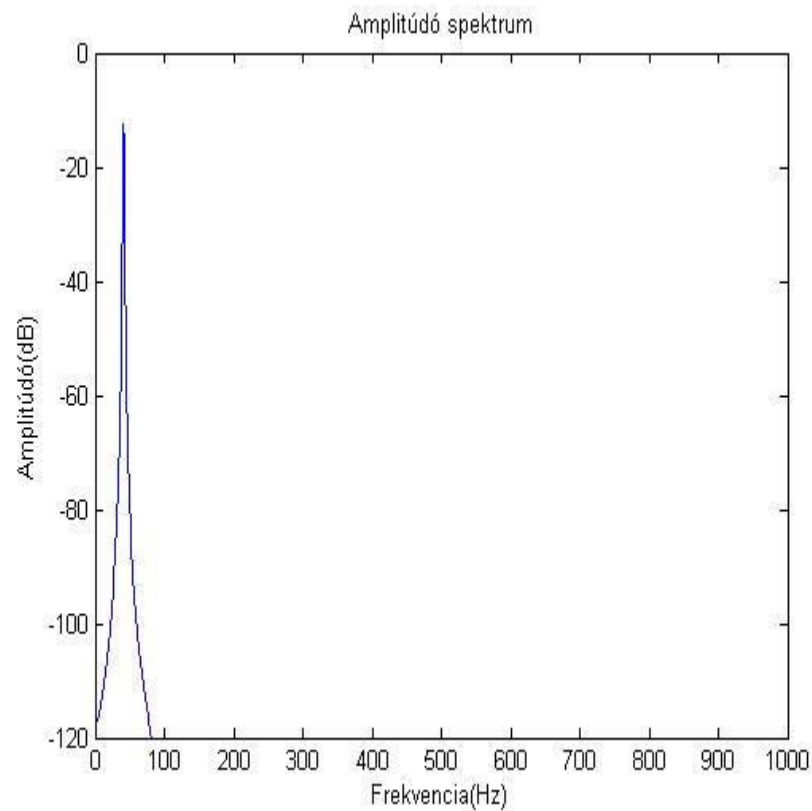
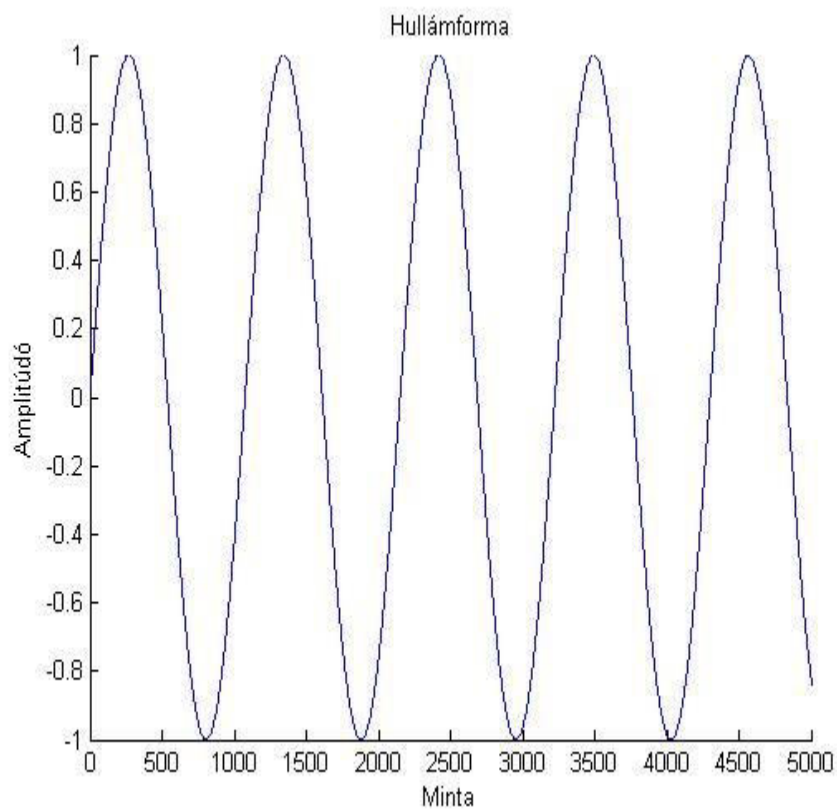
OPL3

- FM szintézis chip
- SoundBlaster hangkártyák
- Főleg a 90-es években (PC)

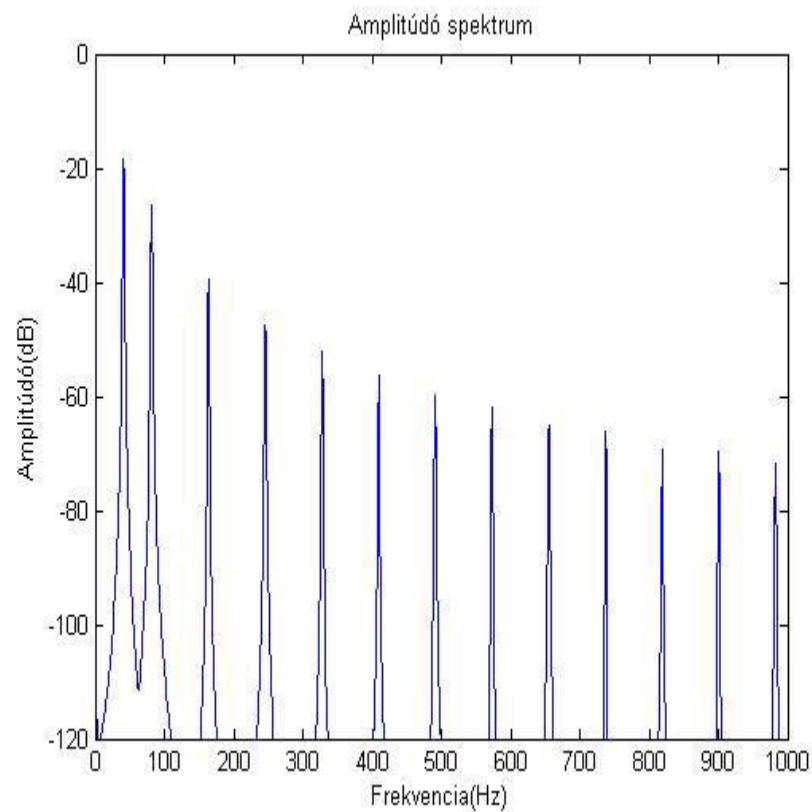
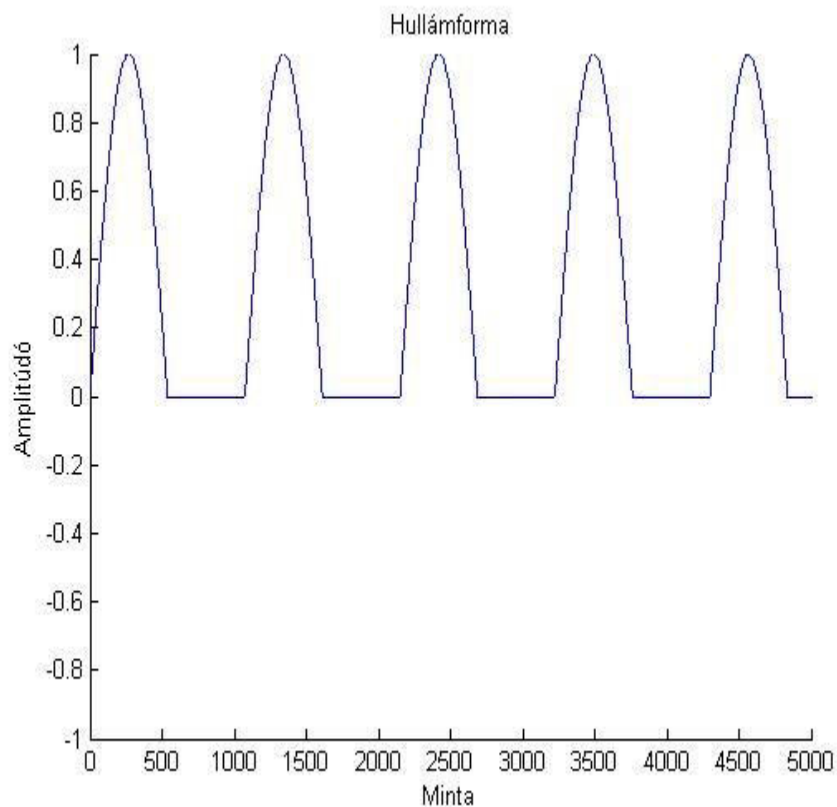
Jelalakov

WS = 0		WS = 4	
WS = 1		WS = 5	
WS = 2		WS = 6	
WS = 3		WS = 7	

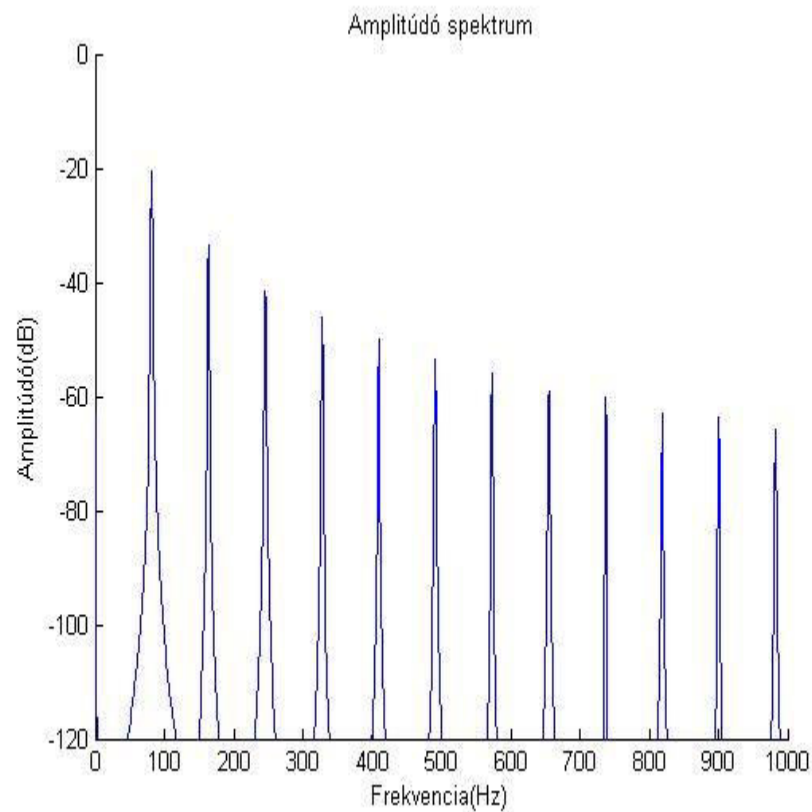
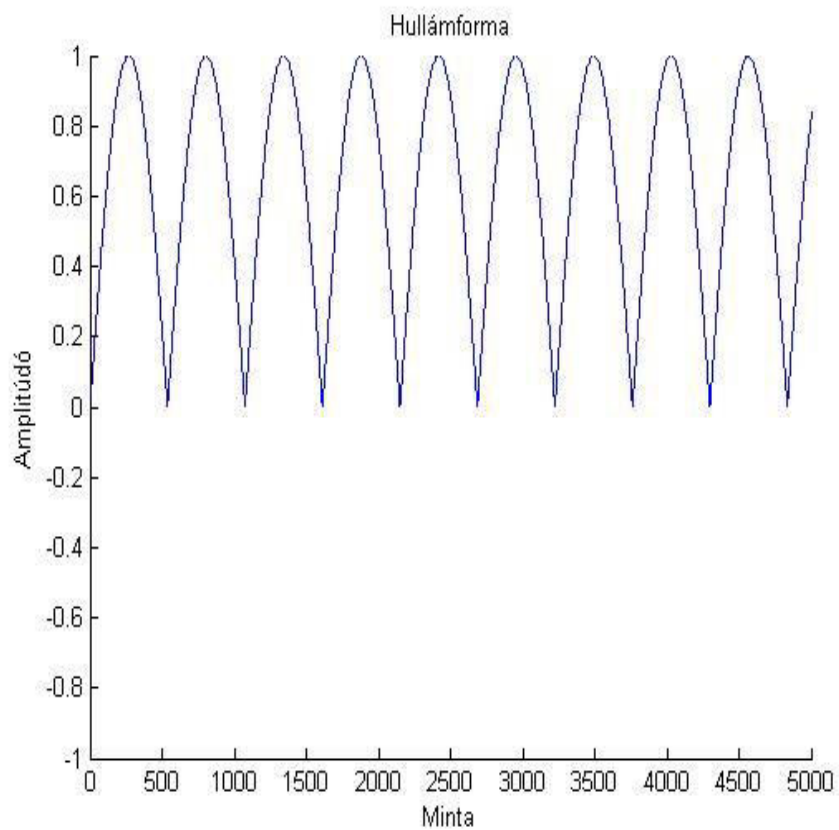
Jelek és spektrumai



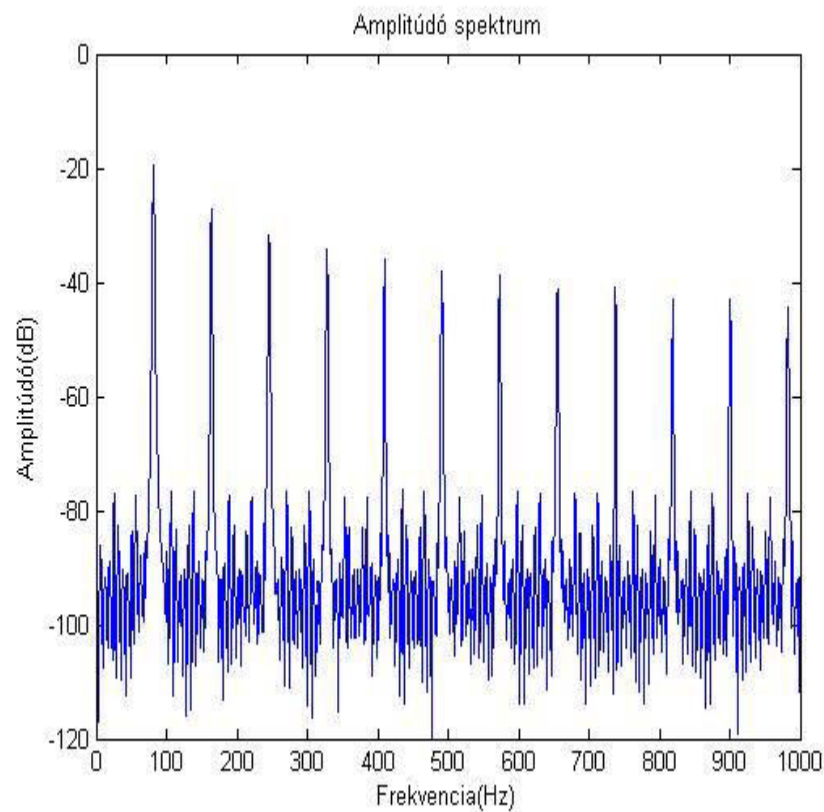
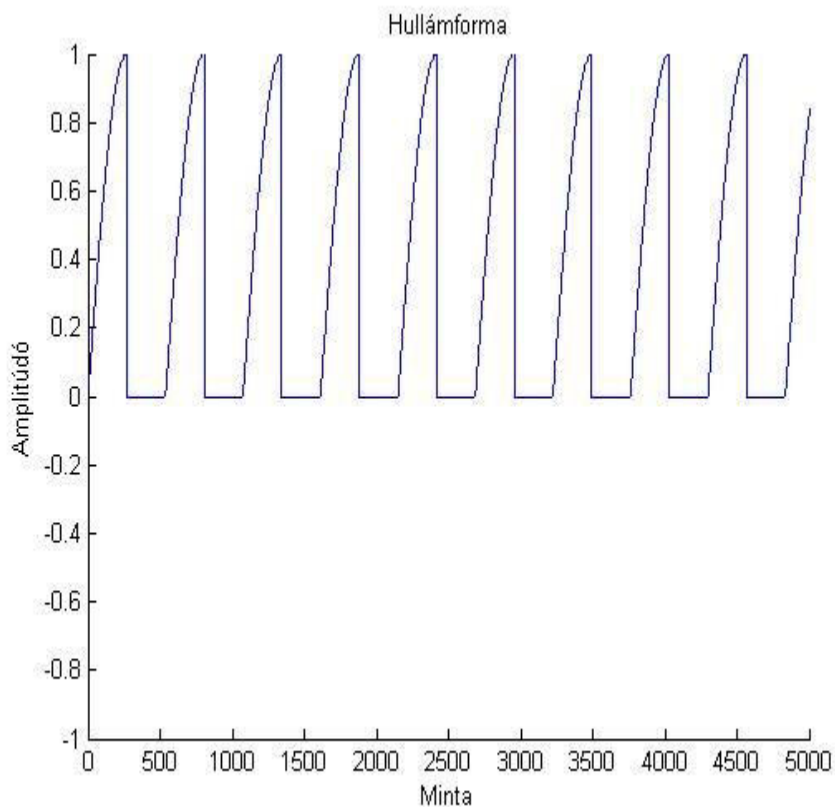
Jelek és spektrumai



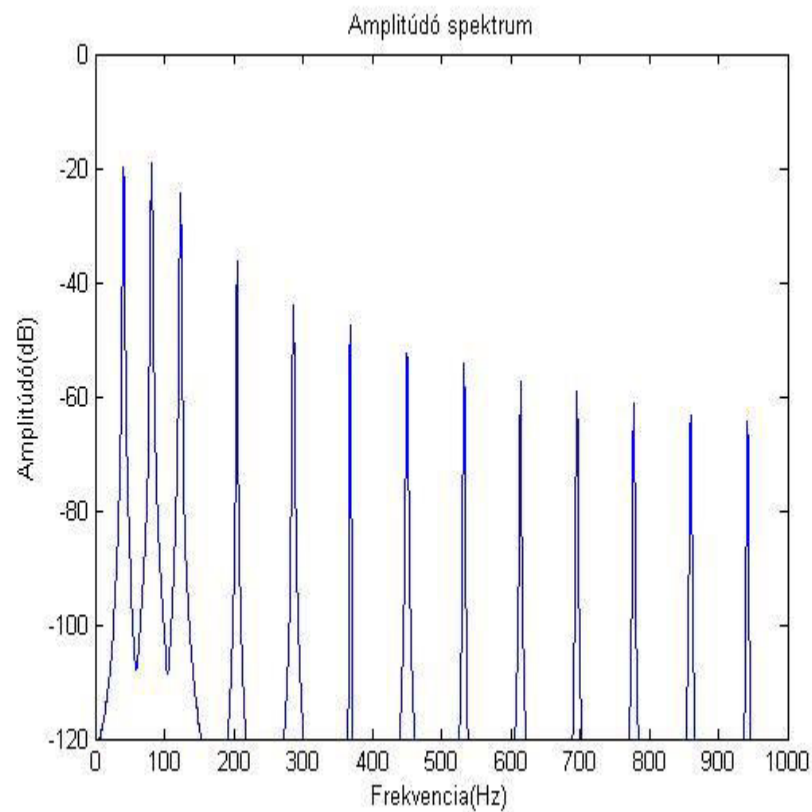
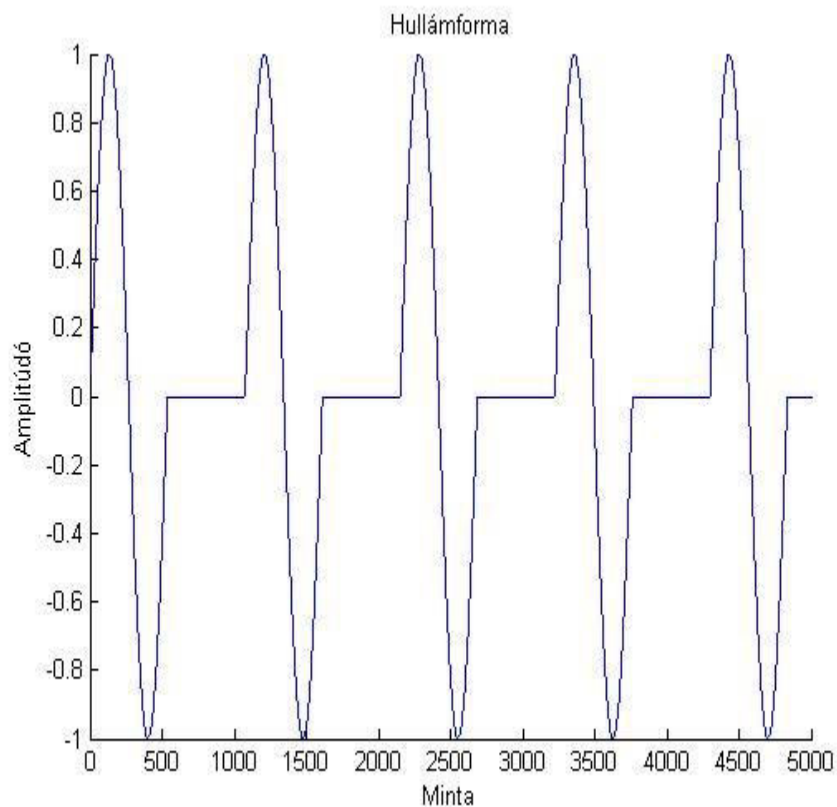
Jelek és spektrumai



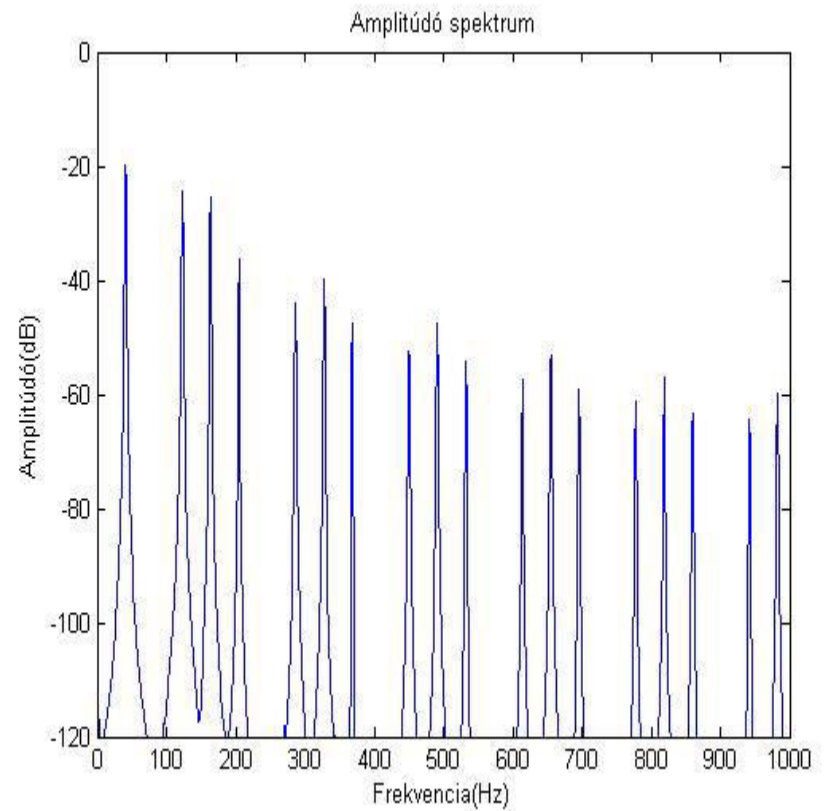
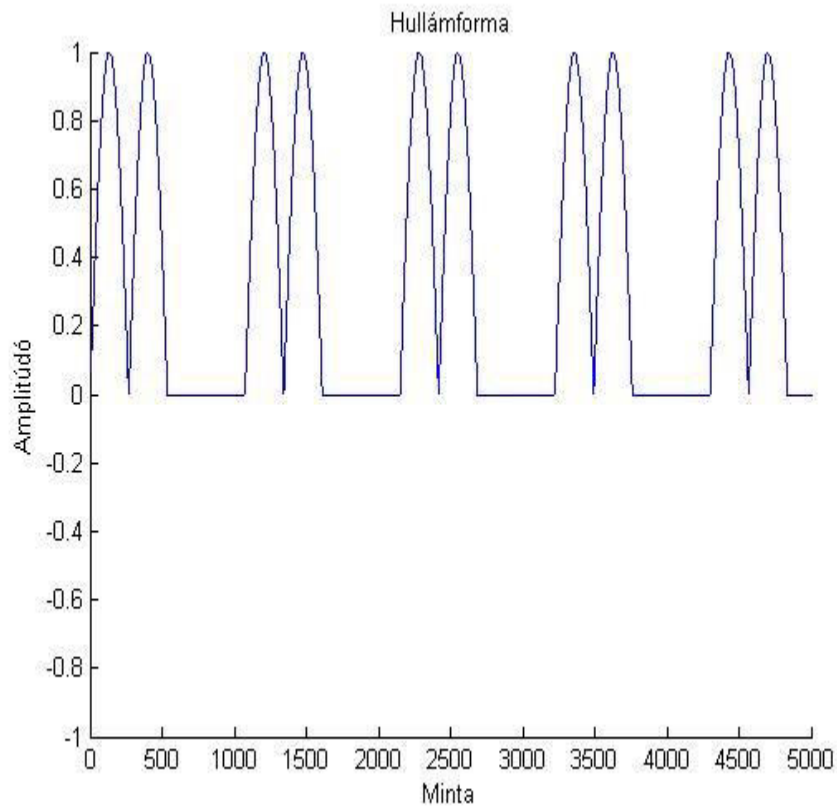
Jelek és spektrumai



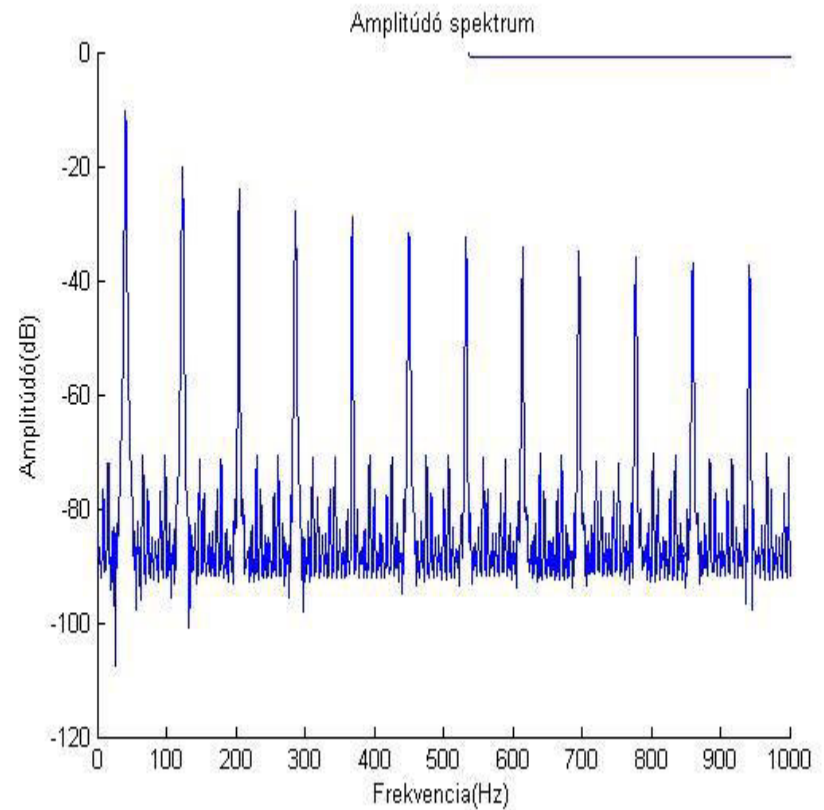
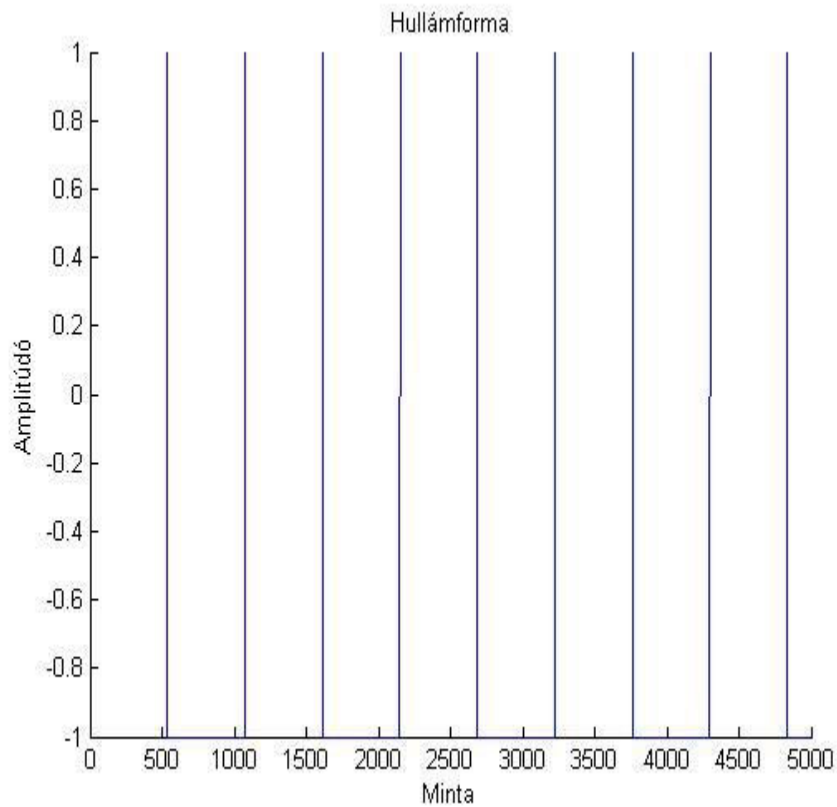
Jelek és spektrumai



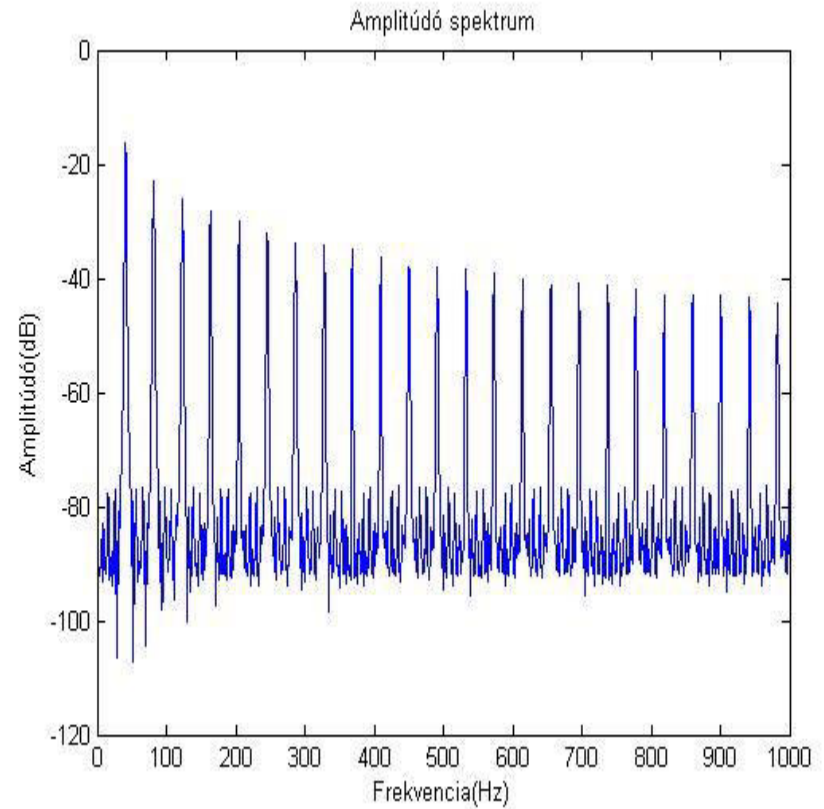
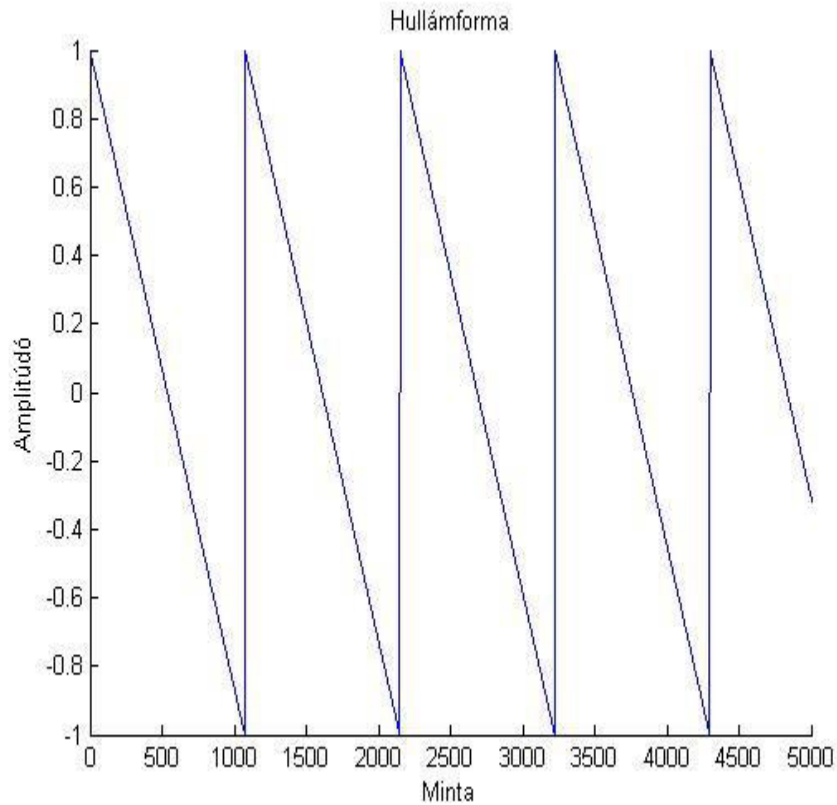
Jelek és spektrumai



Jelek és spektrumai



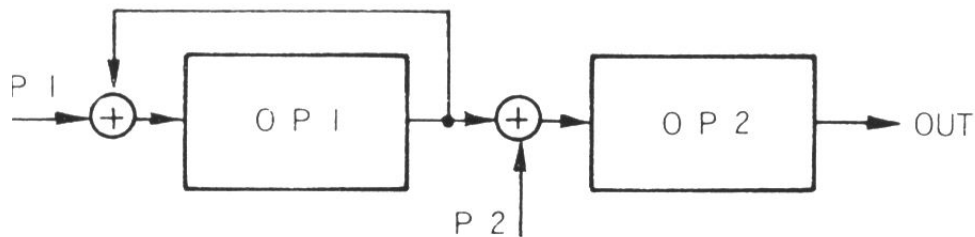
Jelek és spektrumai



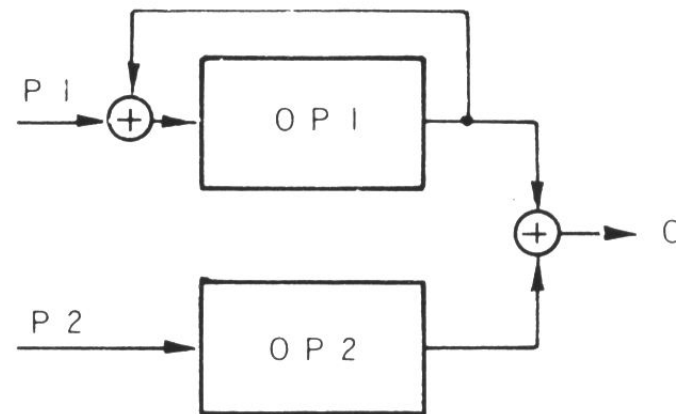
Oszcillátorok felhasználása

- 2 oszcillátor mód

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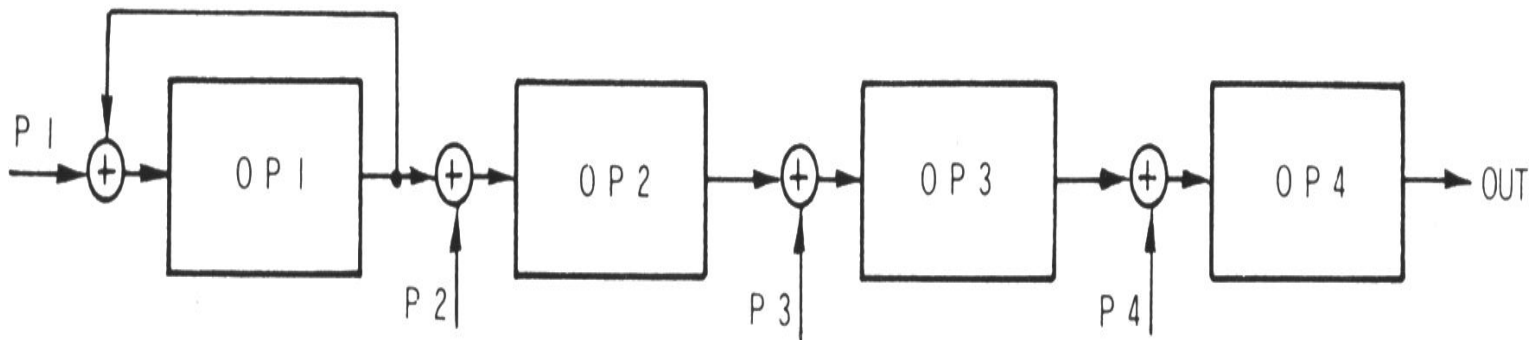


CNT = '1'



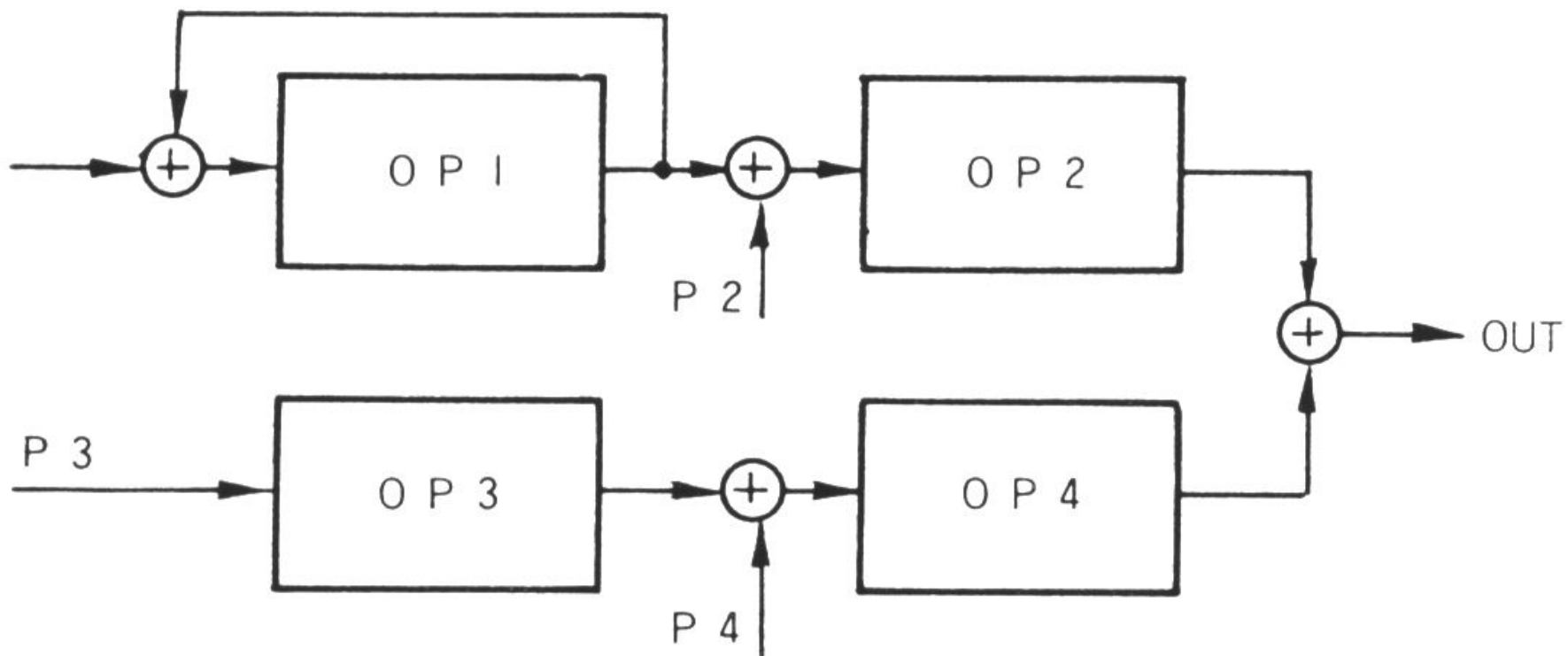
Oszcillátorok felhasználása

- 4 oszcillátor mód



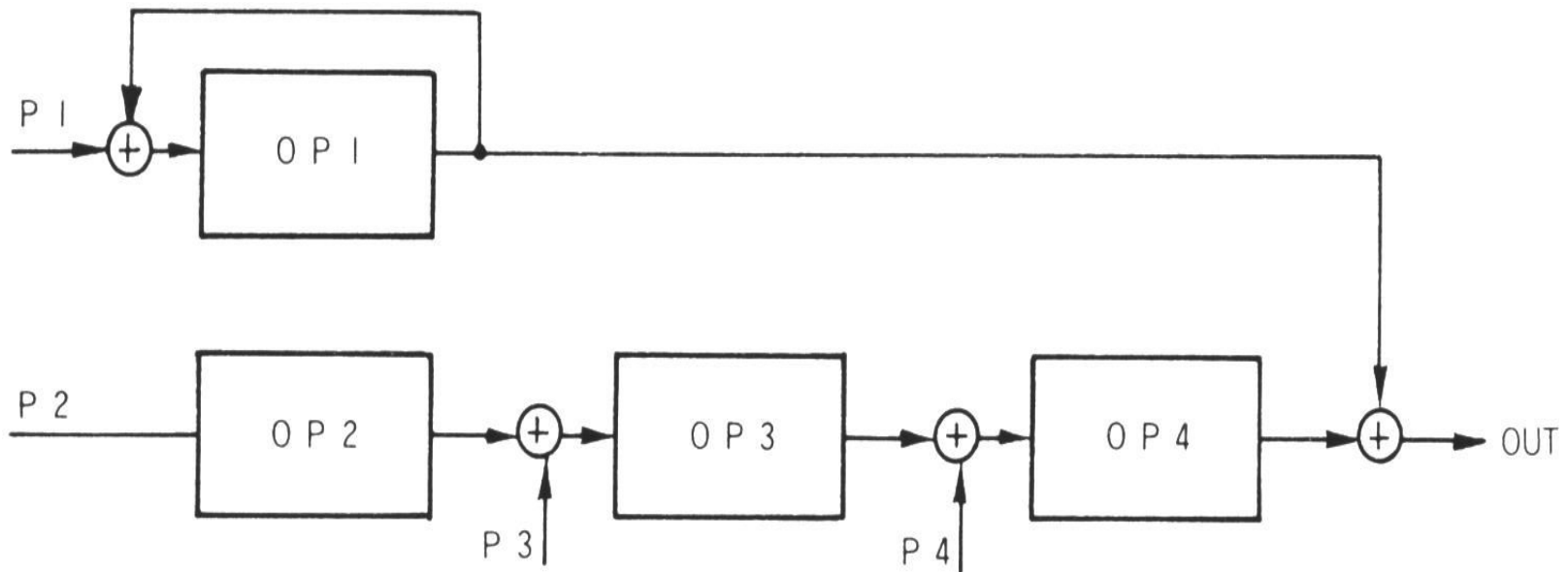
Oszcillátorok felhasználása

- 4 oszcillátor mód



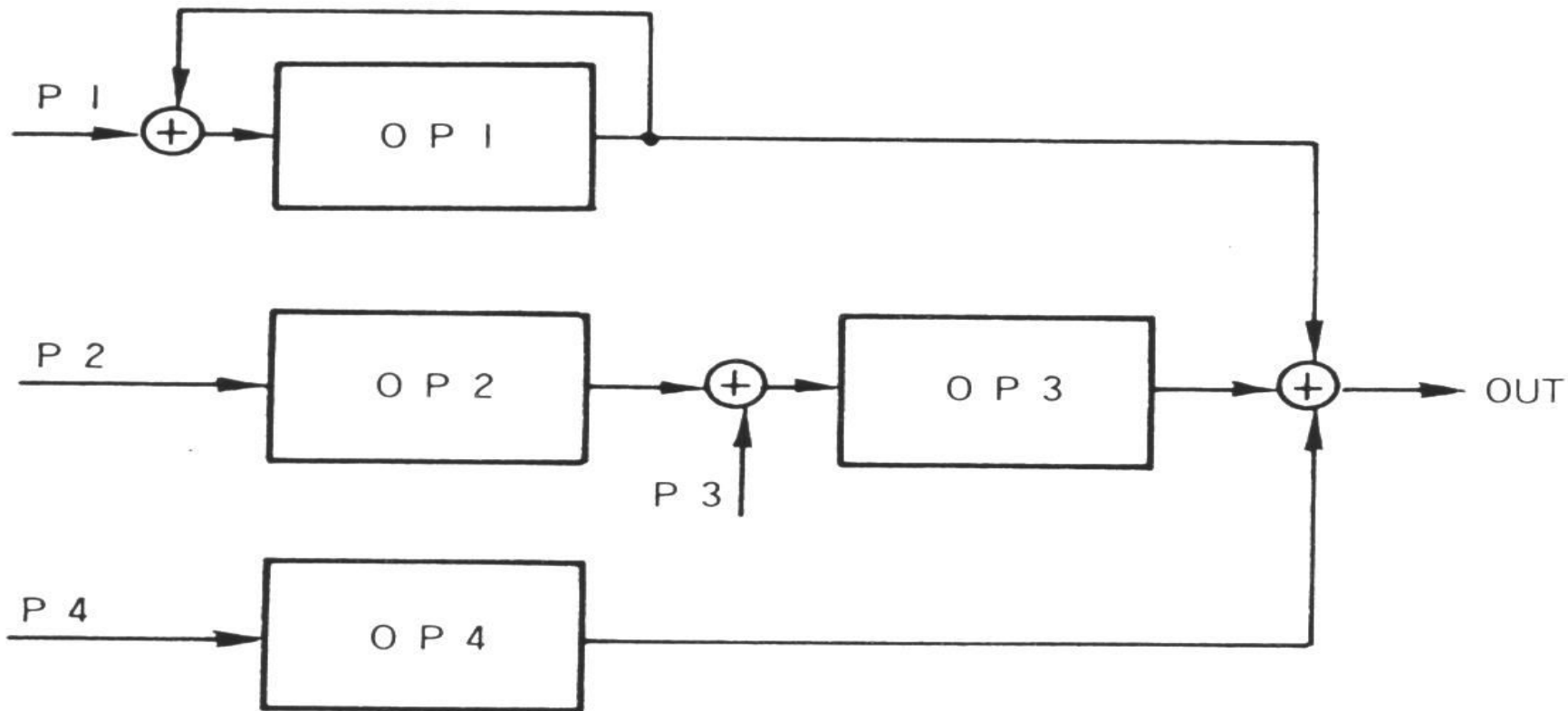
Oszcillátorok felhasználása

- 4 oszcillátor mód



Oszcillátorok felhasználása

■ 4 oszcillátor mód



Félévi munka

- PM jel megvalósítása
- 8 jelalak megvalósítása
- Minta alapú feldolgozás
- Oszcillátorok összeköttetése
- VST és Juce megismerése

MATLAB

- Oszcillátor példányosító függvény
- Minden oszcillátor módnak külön függvény
- Függvények bemenete:
 - 2 v. 4 oszcillátor adatvektora(f, A, w)
- Függvényen belül generáljuk és kötjük össze az oszcillátorokat bemeneti adatvektorok alapján.

Új félév munkája

- C++
- VST plugin (Juce segítségével)
- Szakdolgozat megírása



Köszönöm szépen a figyelmet!