DESC9115 DIGITAL AUDIO SYSTEMS 2012

Instructor: William L. Martens

Student: Tsun Kit Lam

SID: 420088455

Help Manual

LPC Cross Synthesis & Distortion

The LPC cross-synthesis between two sounds can also be achieved by using one filter to remove the spectral envelope (which is the resonance) of the input signal. The excitation of the input signal is filtered by the spectral envelope of the preset sound.

The prediction coefficients of the input signal are used to whiten the sound by using the FIR filter. The prediction coefficients of excitation are used in the feedback path of a synthesis filter, which performs filtering of the input signal with the spectral envelope derived from excitation sound.

In addition, the distortion simulates a clipping function to the signal during the process, resulting in harmonic added to the signal, giving it a fuller and harsher sound.

Syntax

```
xy = lpcdistort(inwave, p1, gain, mix, exsignaltype, p2)
```

Description of Function

lpcdistort.m cross synthesizes the filter resonance of the input signal and excitation signal that is chosen. In addition, distortion can be applied on the resonance of the input signal.

Parameter

Input

Excitation Signal (Using Different Cases)

Users only have to import the inwave (input signal), 61 sets of presets data are provided in the folder. Allowing users to experiment with a wide range of resonance characteristics. Users do not

have to import the data sets manually, when the type (case) of bongo signal is chosen, the particular data will be imported automatically by the function.

Tips For Using This Function

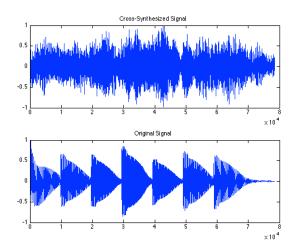
For achieving extreme (noticeable) effect, set the p1 and p2 up to at least 200. In addition, the higher the amount of distortion gain, the longer each note will sustain. For reverb alike effect, set p2 way higher than p1, e.g. p1=5, p2=10000

Example

Transform between the input synth bass wave file and the fuzz synth excitation signal (case 6), into a synthesized sound that sounds like a distorted bell with false reverb (due to high resonance)

```
[inwave fs] = wavread('bass.wav');
xy = lpcdistort(inwave, 10000, 300, 1, 6, 10000);
```

This function outputs the affected signal as a data vector, a wave file written to disk, a playback function in matlab, as well as a plot that compares the xy (output signal) with the inwave (input signal).



Reference

Matlab Code

David, M MATLAB Digital Audio Effects Processor

Cardiff University

Cardiff School of Computer Science & Informatics

See Also

lpc, filter, freqz, wavread, sound, sign, exp, max, abs, switch