Welcome to Elastic Audio

An introduction to VariPhrase technology

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VariPhrase is a unique and simply amazing technology that allows you to manipulate the frequency and time characteristics of audio independently, making it elastic. The pitch, formant and playback speed of samples can be separately changed and modulated in realtime by controllers, envelopes, LFO generators and the step modulator. To understand VariPhrase in an essence and realize it's possibilities, it is convenient to look at it in two different domains: spectrum and time.

In the *spectral domain*, each melodic sound usually has two groups of frequency components: the base tone and the formant. Typically, such sounds are formed by two different objects, one of them being an oscillator (which defines the frequency of the base tone - the base frequency and it's harmonics), and the second one is a filter/resonator (which affects the base tone's harmonic content but also introduces non-harmonic oscillations which form the formant).

Below are a few examples of different sounds and which objects form the base tone and shape the formant.

Type of sound	Base tone	Formant frequencies
Human voice	Vocal folds	Chest, Throat, Mouth
Guitar, Violin	String	Body
Flute, Trumpet	Body	Body
Jaw harp	Metallic ribbon	Throat, Mouth
Subtractive synthesizer	Oscillator	Resonant filter

Formant is a very important property of the sound. For instance, two humans may sing the same note (generating the same base tone with vocal folds), but their obviously-different chests, throats, mouthes and other organs (serving as resonators) define their unique voices. Also, there may be two guitars with same strings and frets, but different body geometry and materials will give them different sound characters.

Analyzing a sample, VariPhrase designates which components represent the base pitch (and even base pitches of sequential notes in a monophonic phrase) and which stand for the formant frequencies[1], and allows you to vary and modulate them independently through the *Pitch* and *Formant* parameters, also not changing the time characteristics of this sample. With the *Robot Voice* function the pitches of all sequential notes in a phrase get aligned to the pitch of the key you play.

In the *time domain*, VariPhrase lets you play audio at any speed, reverse and even freeze it in realtime without touching the spectral domain (pitch and formant). It is also possible to play a sample in polyphonic legato mode, so that if you press a key while holding the previous key, the next sample doesn't restart but instead starts just where the previous was playing (allows for creating harmonies, realtime rephrasing, etc.). In addition, VariPhrase allows to trigger individual chops of a phrase in a sequence or lay them out on the keyboard like a kit.

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[1] Note that for purely harmonic signals like saw or square waveforms, VariPhrase doesn't allow to change the formant because there aren't any formant frequencies present in them.

Turning any sample into an elastic VariPhrase waveform simply requires you to encode it using one of the four algorithms which are especially designed for different types of source sounds and how the actual encoded samples will be used. These algorithms are *Lite*, *Solo*, *Backing* and *Ensemble*, and below is a table giving you an overview of them.

Encoding	Applications
Lite	This encoding type is intended for samples that will be used with VariPhrase off. Do not use this encoding for serious VariPhrase processing.
Solo	Special algorithm for monophonic audio samples only, with all VariPhrase features available.
Backing	Intended for non-pitched sounds such as drums, effects, etc. *Robot Voice* and *Formant* controls not available.
Ensemble	Algorithm for polyphonic phrases and otherwise multi-pitched sounds like instrument+drum loops and such. *Robot Voice* and *Formant* controls not available.

Summing everything discussed above up, here are just a few examples of how VariPhrase can be used:

- You can stretch the pitch of a sample across several octaves without altering it's character and speed.
- By modifying the formant frequencies of a sample, you can alter it's distinct character - for instance, change the gender of the human voice or the body type of a guitar.
- Legato playback allows for "re-phrasing" monophonic phrase samples and creating polyphonic harmonies.
- Using the realtime controllers you can manipulate sample's time like if you controlled the playback of a vinyl disc or a tape with your hand, yet without altering sound's pitch and character.
- You can freeze a sample at any point and turn it into an eternal waveform. For example, it's possible to make a choir sound out of a vocal phrase, or extract a single guitar note out of a phrase to create a guitar patch.
- Using *Robot Voice*, you can freeze the pitch of a sample, so that all notes get "aligned" to the note you play from the keyboard. For instance, if you have a vocal phrase singing notes C4, F4, G4, they all will shift to whatever key you press (i.e. if it's the A3 key, all of these notes will shift to A3). This allows you to create harmonies and "paraphrase" samples.
- It's possible to tempo-synchronize samples very easily and with much less artifacts compared to traditional time stretching.