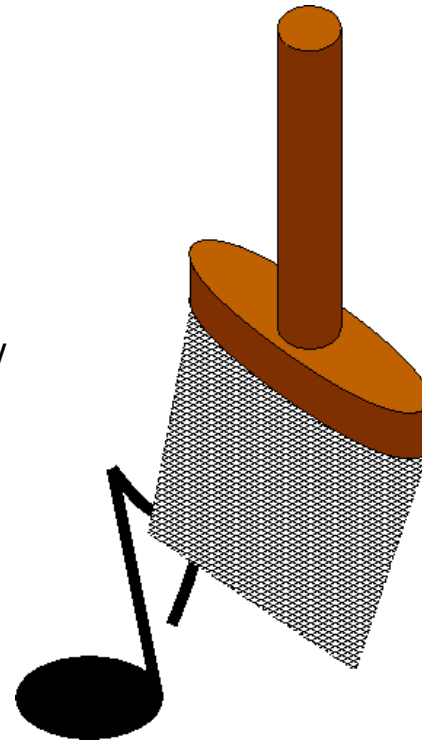


# SoundPaint — Painting Music

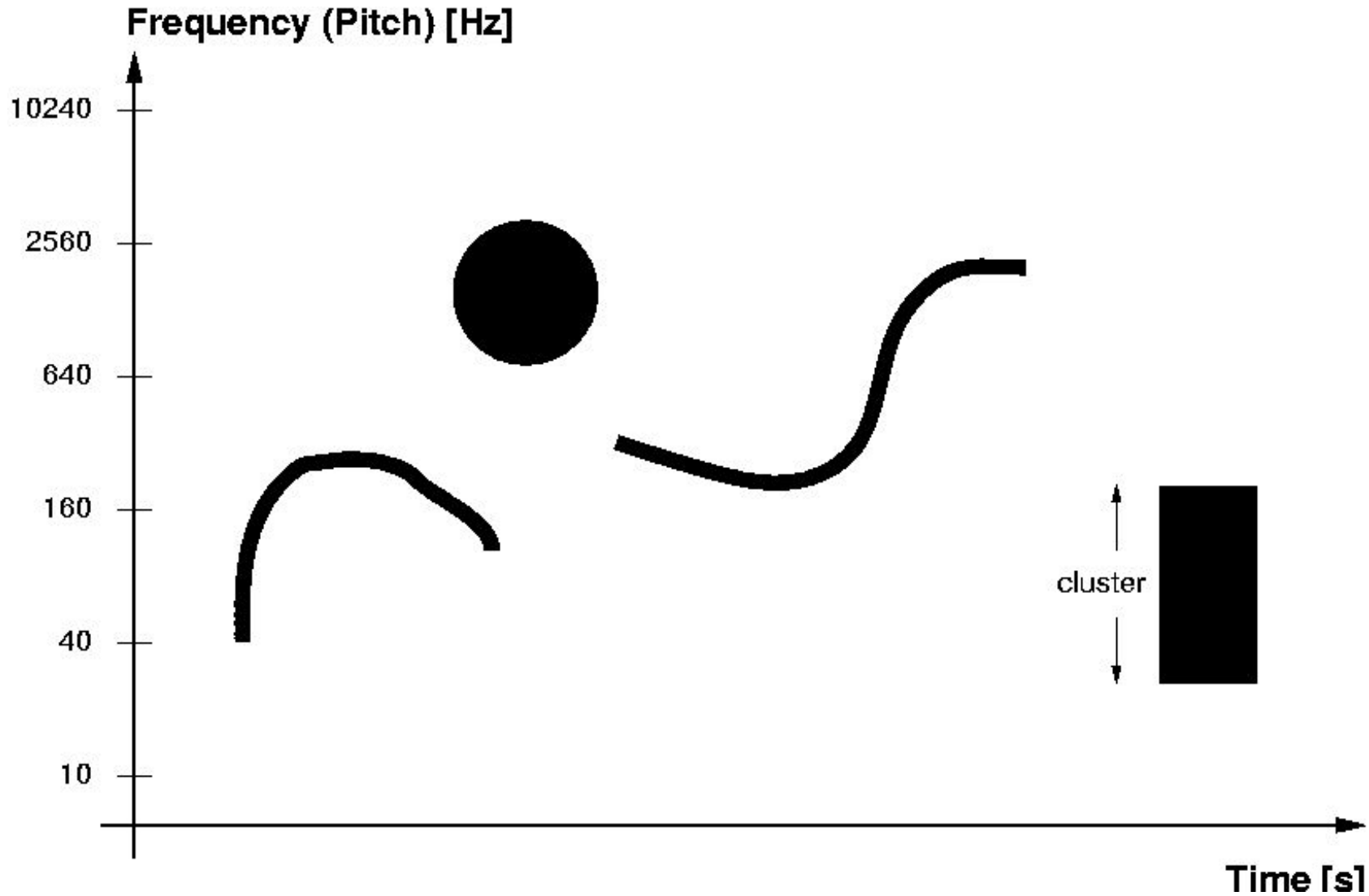
<http://www.ipd.uka.de/~reuter/soundpaint/>



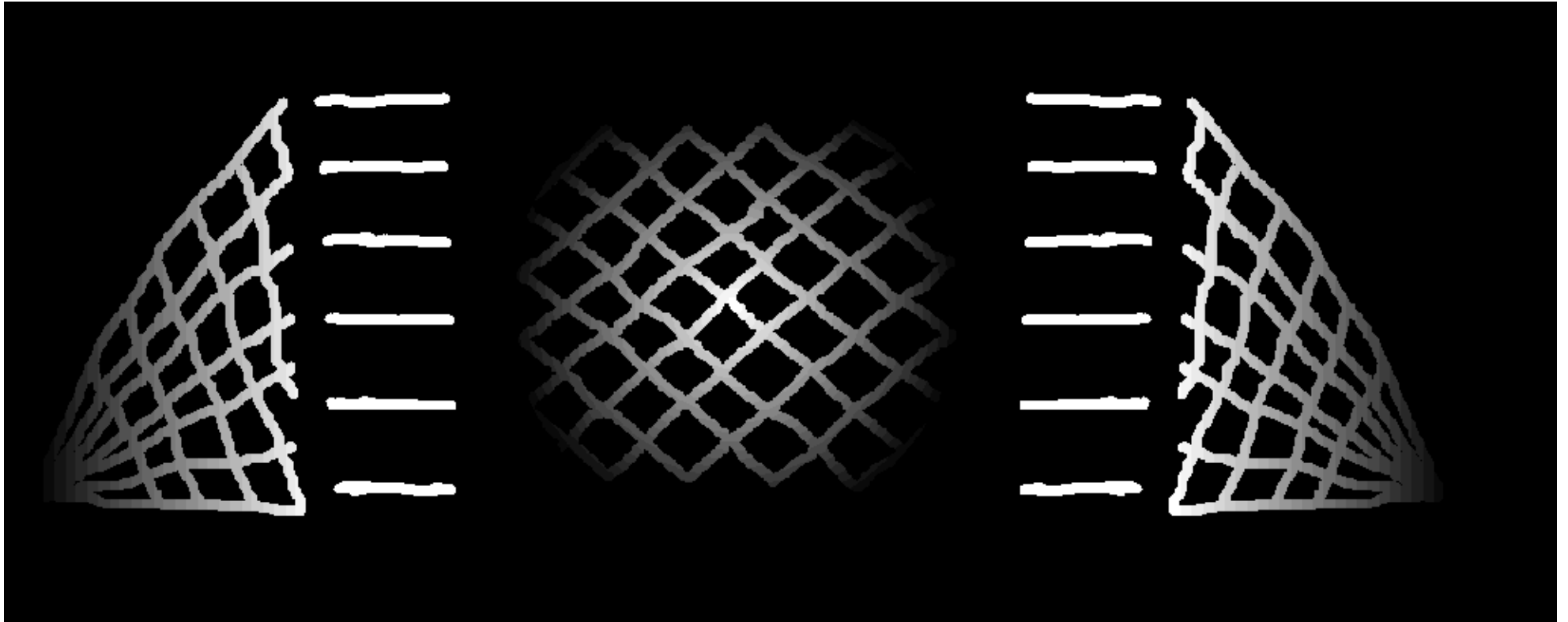
# Motivation

- Integration of sound engineering & composing
- More expressive electronic music
- Graphics as input
- Stick close to graphical notation
- Simple, intuitive interface

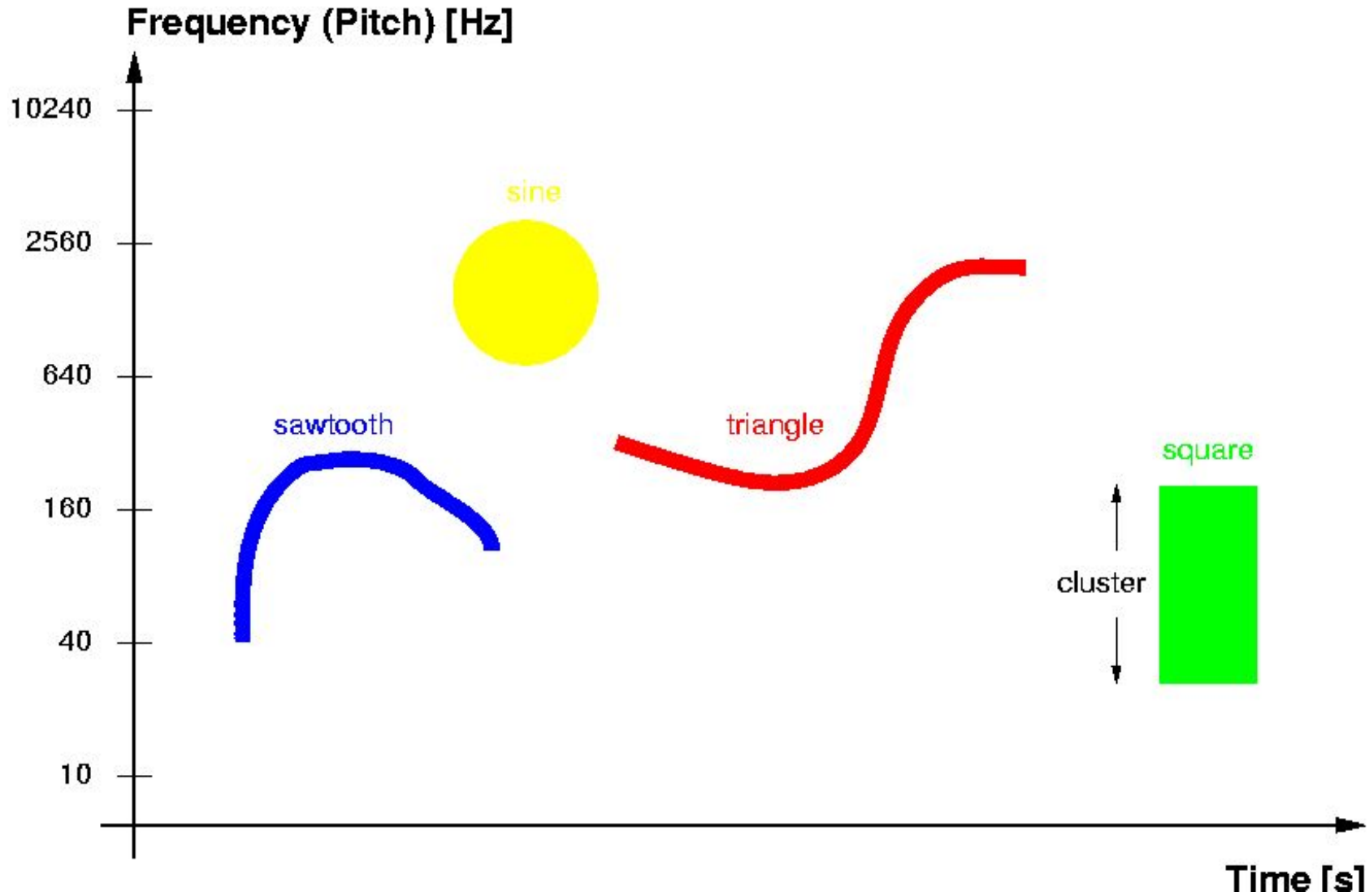
# Additive Synthesis



# Sound Example



# Color -> Sound

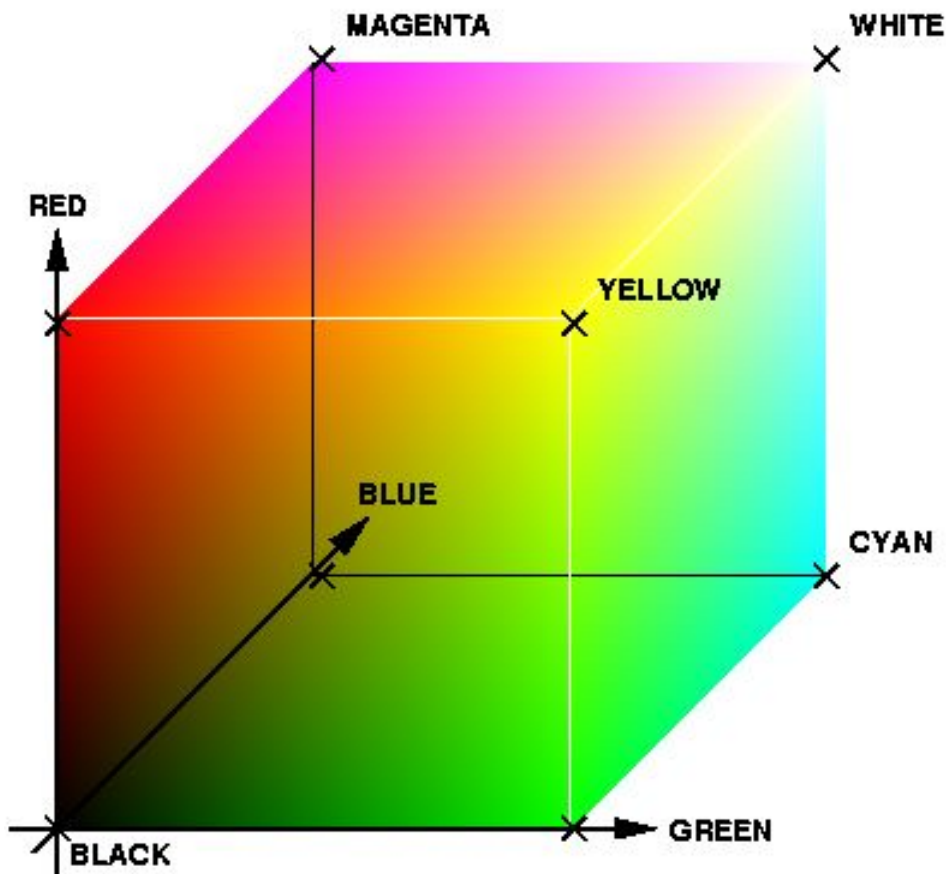


# Color -> Sound Mapping Goals

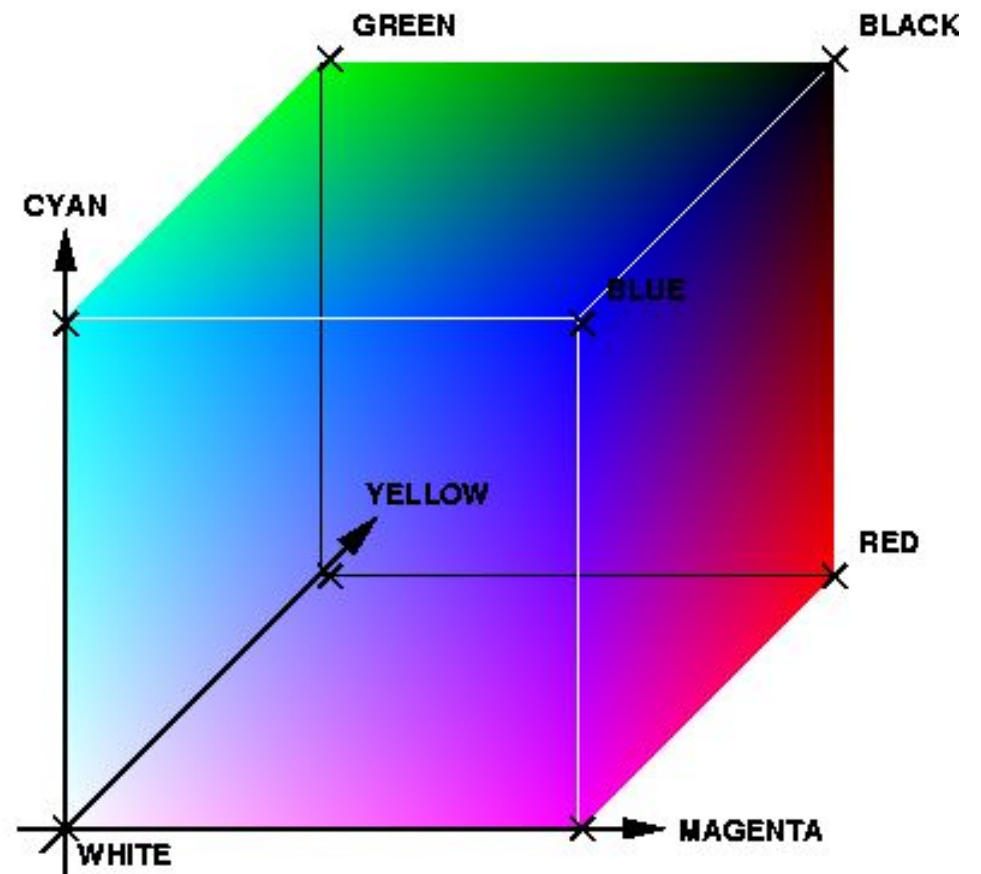
- User-definable
- Cover all colors
- Require only few data for definition
- Keep it simple (not targeted at math experts)
- Map color gradients => sound gradients

# RGB Color Space

**Additive**



**Subtractive**

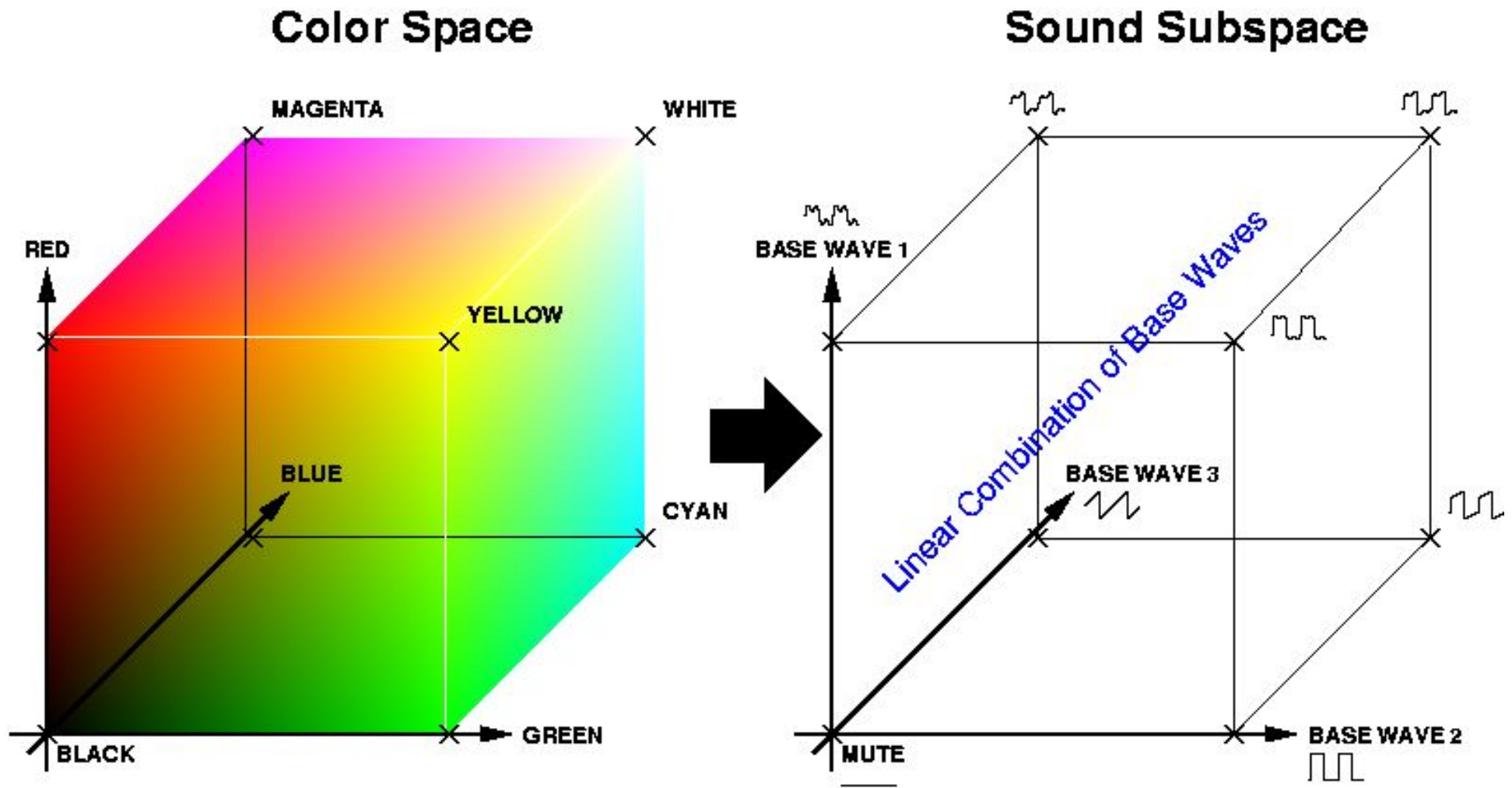


# Color -> Sound Mapping Approach

- Problem: infinite dimensional sound space
- Idea: select 3-dimensional sound subspace
- Assign 3 colors to 3 sounds
- Interpolate all other colors
- => all goals fulfilled



# Color -> Sound Mapping



# Mapping Issues

- Just doing linear interpolation on wave forms
- => color gradients simply map to crossfading
- Does not sound very appealing, but just like mixing 3 sound sources
- Need rather something like sound morphing

# Mapping Revisited

- Solution: add non-linear content
  - i.e. any sound parameter not controllable by crossfading
  - e.g. vibrato rate/depth, detune depth, echo speed, ...
  - only assumption: parameter can be linearly controlled, e.g. by moving a slider
- Now linearly

# Generalized Mapping

- Interpolate sounds by
  - linear combining wave forms (wave form crossfading)
  - linearly interpolating sound parameters of non-linear sound content
- => get something similar to sound morphing

# User Interface

The image shows two overlapping software windows. The top window is titled "Triangle Sample Editor" and contains a "Duty cycle" slider set to 73, a waveform plot showing a triangle, and an "Effects" section with sliders for "Pan" (33), "Vibrato depth and rate" (100), and "Noise" (10). The bottom window is titled "Color Settings" and features three color selection panels: "Sound Color 2" (green) and "Sound Color 3" (blue). Each panel includes a "Color" selector, a "Sample" dropdown menu (set to "Triangle" and "Square" respectively), and a "Sample Properties..." button. Annotations with yellow arrows point to various UI elements: "Wave form type specific editor" points to the waveform plot; "Generic Sound Parameters" points to the "Effects" section; "Color -> Sample Mapping" points to the "Sample" dropdowns; "Opens editor" points to the "Sample Properties..." button in the "Sound Color 2" panel; and "Wave form type selection" points to the "Triangle" dropdown in the "Sound Color 2" panel.

**Triangle Sample Editor**

Duty cycle: 73

Effects

Pan [0 (L) .. 100 (R)]: 33

Vibrato depth and rate: 100

Noise: 10

Play Cancel Ok

**Color Settings**

Sound Color 2

Color: [Green] Select...

Sample: [Triangle] Triangle

Sample Properties...

Sound Color 3

Color: [Blue] Select...

Sample: [Square] Square

Sample Properties...

Ok

**Wave form type specific editor**  
linear interpolation of arbitrary wave forms

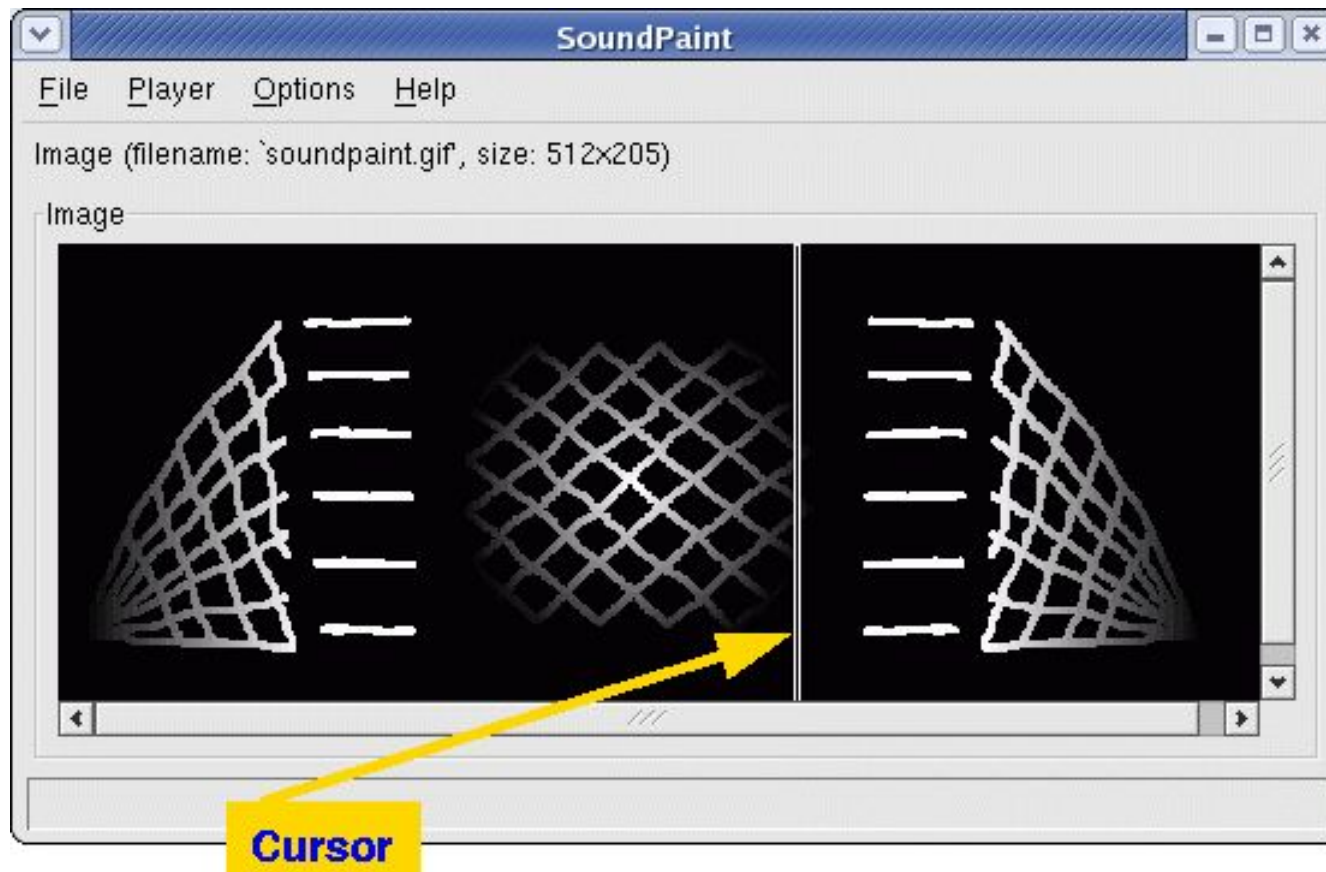
**Generic Sound Parameters**  
linear interpolation of slider values common for all types of wave forms

**Color -> Sample Mapping**

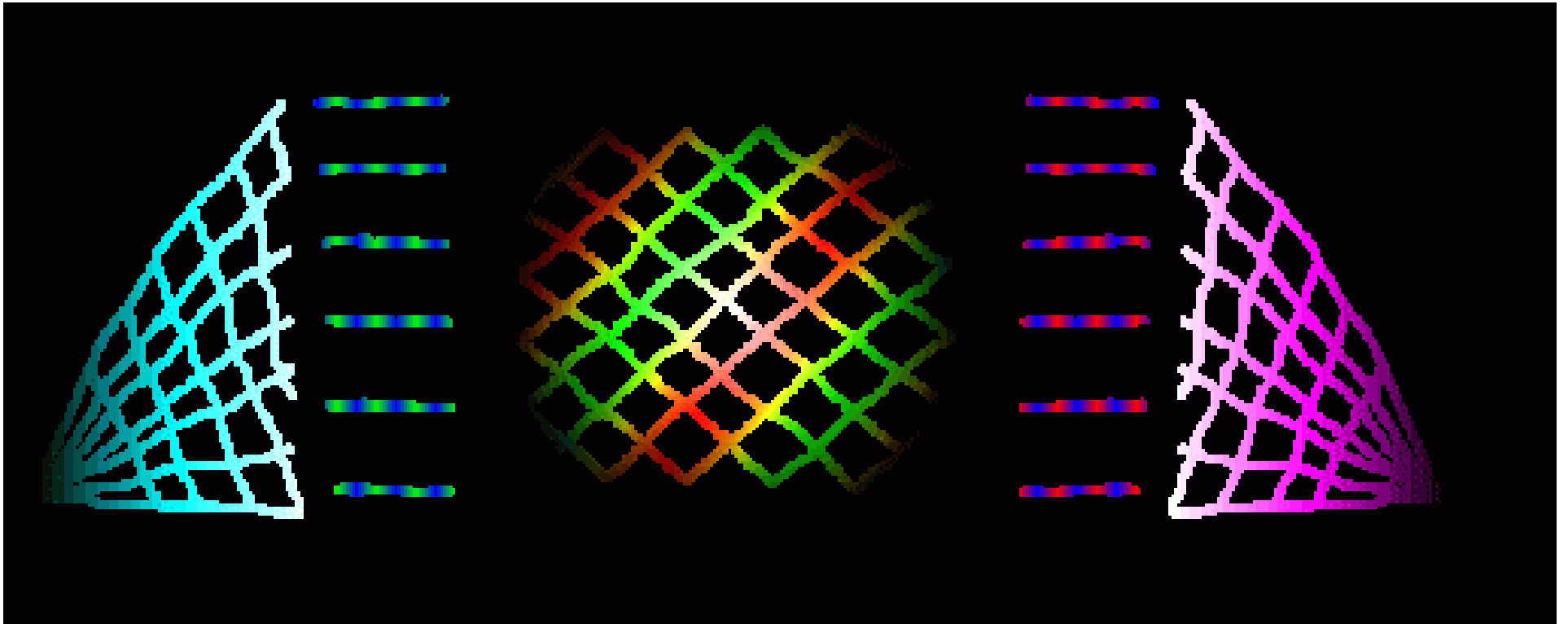
**Opens editor**

**Wave form type selection**

# User Interface (cont.)



# Sound Example



# Future Work

- Subtractive colors, HSB color space
- More non-linear parameters
- Integrated graphics editor
- Real-time capabilities, DJ stuff (looping, ...)
- Raster vs. vector graphics?



# Questions?