Color Images

CS/BIOEN 4640: Image Processing Basics

April 5, 2012
RGB Color Space

Additive vs Subtractive Color Models

Additive Color Model

Subtractive Color Model
Visible Light Spectrum

- **Monochromatic** colors are light at a single wavelength
- Some colors (cyan, pink, ...) cannot be represented by a single wavelength
- These colors are a mixture or spectrum of wavelengths

*Source: Wikipedia*
CIE XYZ Color Space
CIE XYZ Color Space
MacAdam Ellipses

Gamut

Maximum range of colors a display device (monitor, projector, etc.) can reproduce.

Hue/Saturation/Value (HSV)

Hue/Luminance/Saturation (HLS)

Converting RGB to Grayscale

Simple average:

\[ Y = \frac{R + G + B}{3} \]

Better weights for perception:

\[ Y = 0.299 \, R + 0.587 \, G + 0.114 \, B \]
Exploring Colorspaces in ImageJ

Check this out: