Color Perception

Ware – Chapter 4

http://www.efg2.com/Lab/Library/Color/Science.htm

The Visible Spectrum
Three Cones Types

S (short)  M (med)  L (long)

Opponent Processing

R-G  (L-M)
(R+G)-B  (L+M)- βS
(R+G+B)  (L+M+βS)
Color blindness

Ishihara Plates

Most Common – no distinction between R and G

Considering Color Blindness

Neitz Lab
Color in Context of Color

- Isoluminance reduces motion perception, which is most effective for high-contrast stimuli.

Chromatic Aberration
Color Constancy
Differential Sensitivity during the day and twilight

Chromostereopsis

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Representing Color

CIE Color Space

x, y, Y (luminance)
Color Selection Interfaces

Fitting the Options for the Task
Using Color
Using Color

• 5 Values
• Different Labels
• Cultural Issues?

Why should engineers and scientists be worried about color?
Rogowitz and Treinish
Why should engineers and scientists be worried about color?
Rogowitz and Treinish

The color maps are mathematically equivalent

Color Can Be Bad

Topographic Map

T2 Weighted MRI slice

Jet Noise Simulation
Color Can Be Bad

Earth’s Magnetic Field

Two-dimensional sinc function

Color Can Be Good
Color Can Be Good

Ozone density in the atmosphere
Luminance for hi-spatial freq data/ small details
Color and Luminance

• Saturation for low spatial frequency interval data

• Combination of both

Different Colors For Different Tasks

Air pollution distribution:

Isomorphic map

Segmented map

Segmented map
Different Colors For Different Tasks
It’s All Relative…

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