First part of lecture

Exam debriefing

Review of color slides done several class before (previous class was exam, class before that was review).

Specifying Color

(continued from lecture 15)

On my monitor it's
(R,G,B) = (75,150,100)

Specifying Colour

But what is (R,G,B)?

Specifying Colour

R matches (X_r, Y_r, Z_r)

G matches (X_r, Y_g, Z_g)

B matches (X_b, Y_b, Z_b)

Specifying Colour

Then by
(R,G,B)=(75,150,100)
you mean (X,Y,Z),
where …..

$$X = 75* X_r + 150* X_g + 100* X_b$$

$$Y = 75* Y_r + 150* Y_g + 100* Y_b$$

$$Z = 75* Z_r + 150* Z_g + 100* Z_b$$

(No need to match--just compute!)

Specifying Colour

… , now that we have specified the colour, I can print it!

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix} = \begin{vmatrix} X_r & X_g & X_b \\ Y_r & Y_g & Y_b \\ Z_r & Z_g & Z_b \end{vmatrix} \begin{vmatrix} 75 \\ 100 \\ 150 \end{vmatrix}$$

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix} = \begin{vmatrix} X_r & X_g & X_b \\ Y_r & Y_g & Y_b \\ Z_r & Z_g & Z_b \end{vmatrix} \begin{vmatrix} R \\ G \\ B \end{vmatrix}$$

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix} = M \begin{vmatrix} R \\ G \\ B \end{vmatrix}$$

Colour Reproduction (Monitors & Projectors)

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix}_{apple}$$

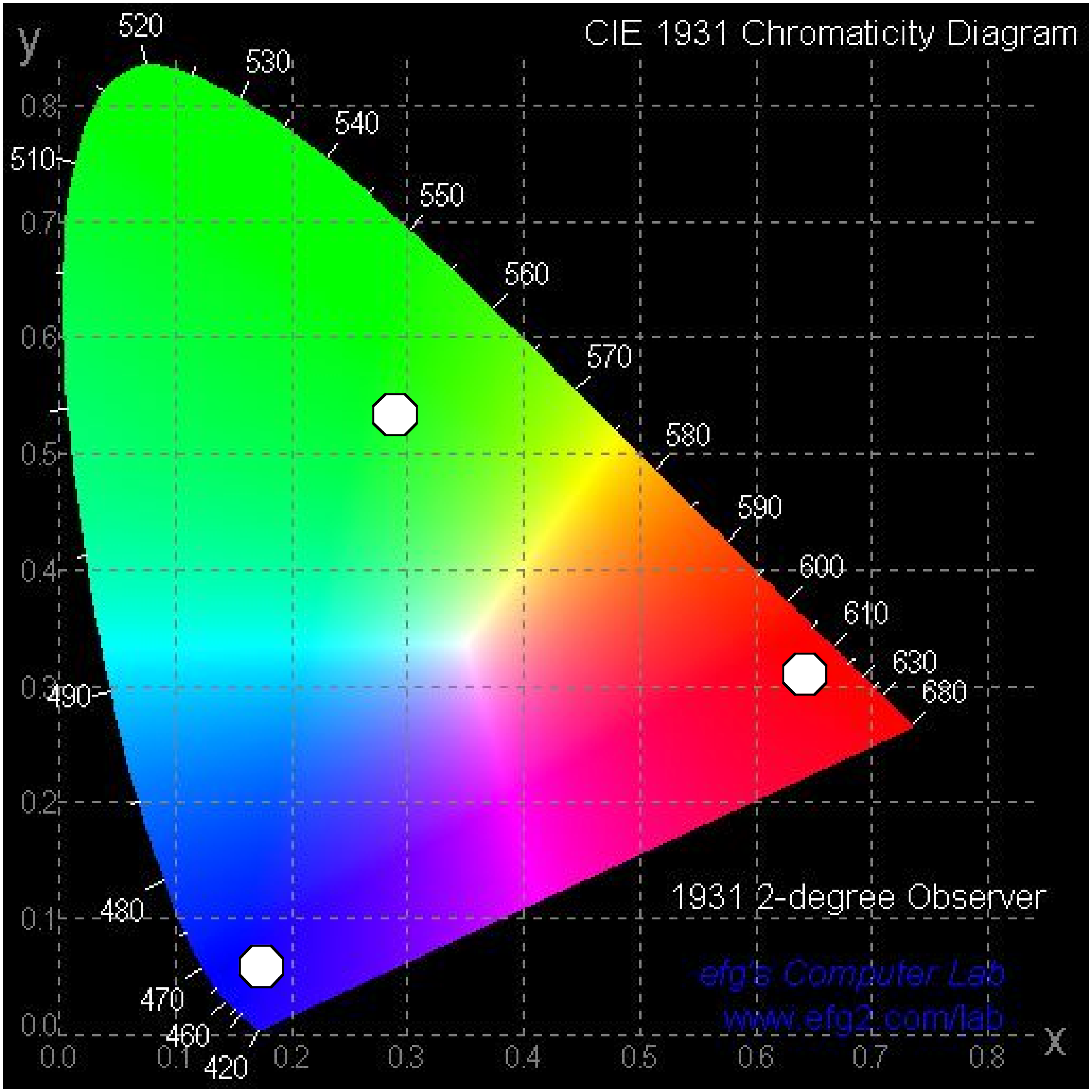
Find (R,G,B)

$$\begin{vmatrix} X \\ Y \\ Z \end{vmatrix}_{apple} = M \begin{vmatrix} R \\ G \\ B \end{vmatrix}_{apple}$$

$$\begin{vmatrix} R \\ G \\ B \end{vmatrix}_{apple} = M^{-1} \begin{vmatrix} X \\ Y \\ Z \end{vmatrix}_{apple}$$

$$\begin{vmatrix} R \\ G \\ B \end{vmatrix}_{apple} = M^{-1} \begin{vmatrix} X \\ Y \\ Z \end{vmatrix}_{apple}$$

Possible problems?



Avalable
from
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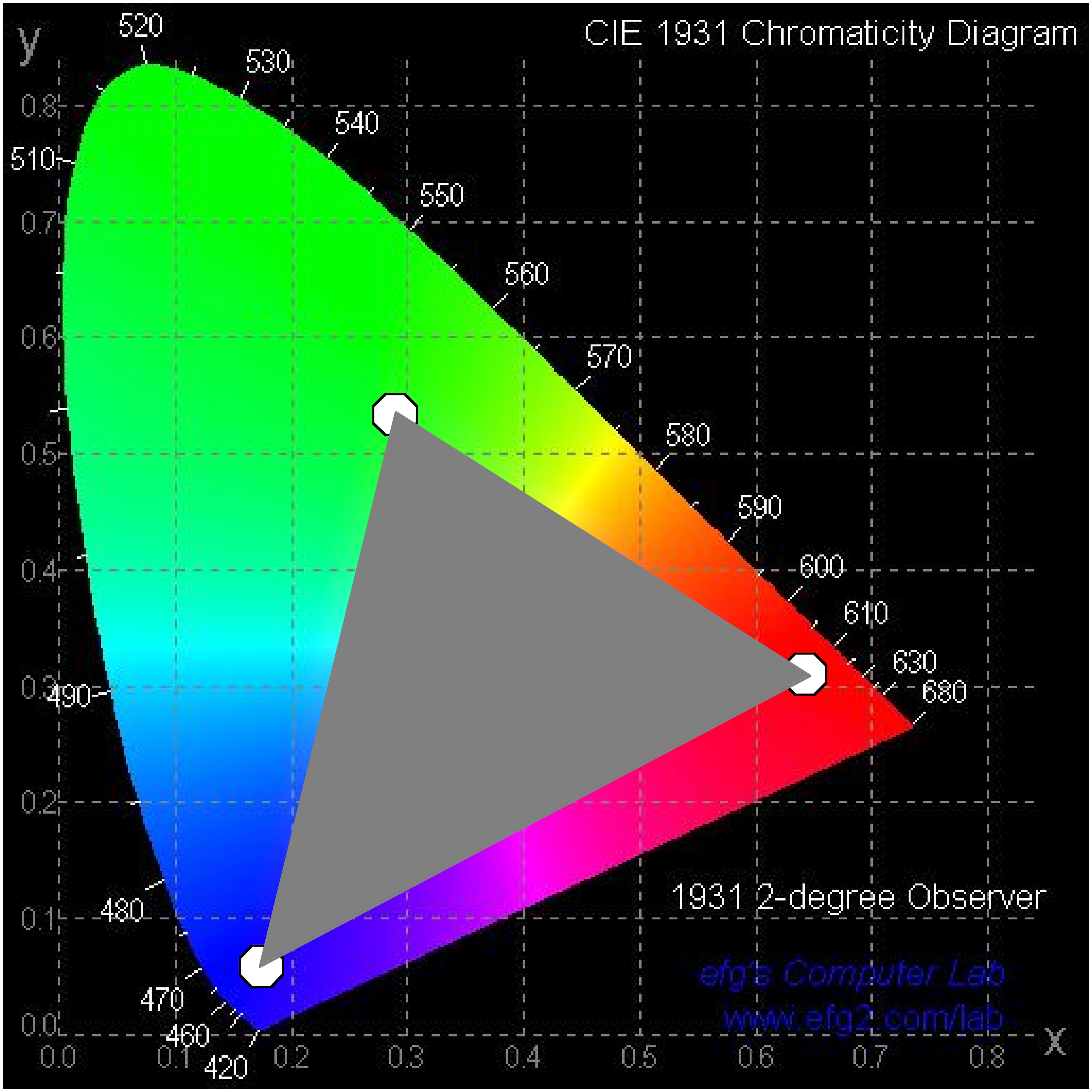

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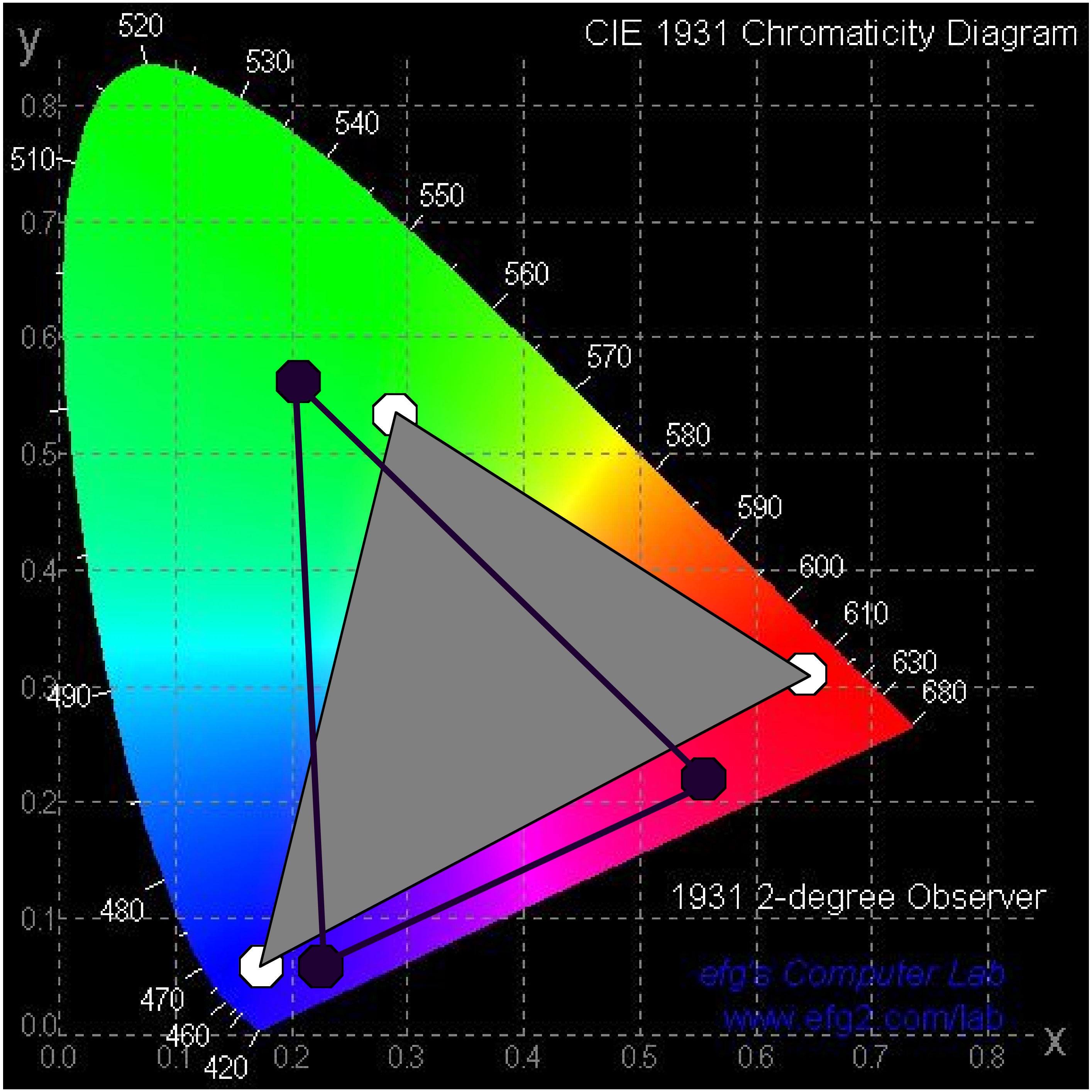

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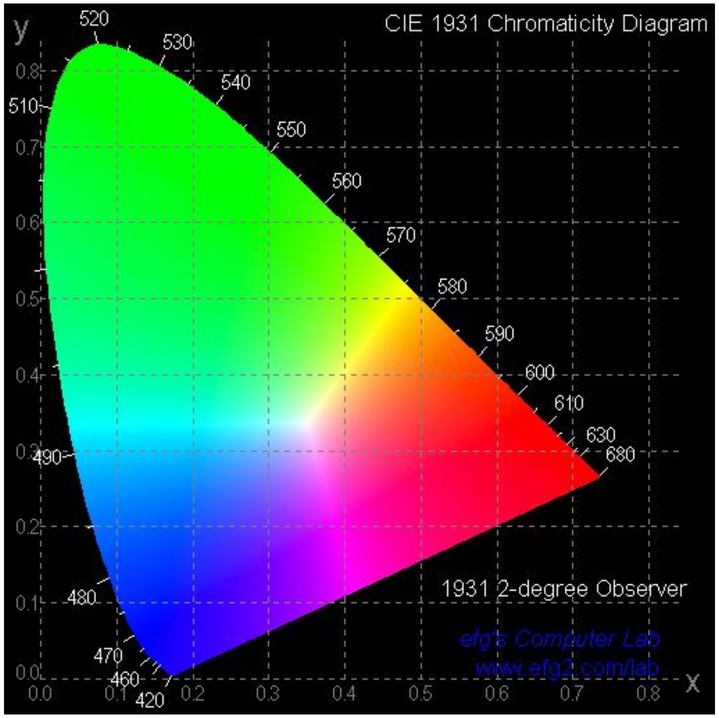
Qualitative features of CIE x, y

- Linearity implies that colors obtainable by mixing lights with colors A, B lie on line segment with endpoints at A and B
- Monochromatic colours (spectral colors) run along the “Spectral Locus”
- Dominant wavelength = Spectral color that can be mixed with white to match



Qualitative features of CIE x, y

- Purity = (distance from C to spectral locus)/(distance from white to spectral locus)
- Wavelength and purity can be used to specify color.
- Complementary colors=colors that can be mixed to get white