

LABJND lightness L^* , tristimulus value discrimination dY , contrast (Y/dY) , and sensitivity (dY/Y)

LABJND lightness for all colours, $L^*_w=50$ for $Y_n=18$
 $L^*=S_{50}(x_n)^{1/3}$ ($Y_n=100, Y>1$)

For the grey discrimination we get:

$$dL^*/dY = (116/Y_n) (1/3) (Y/Y_n)^{-2/3}$$

and for $dL^*=1$ (about 3 thresholds) we can write:

$$dY = 3 (Y_n/116) (Y/Y_n)^{2/3}$$

$$\text{or } \log(dY) = \log(3 (Y_n/116)) + (2/3) \log(Y/Y_n)$$

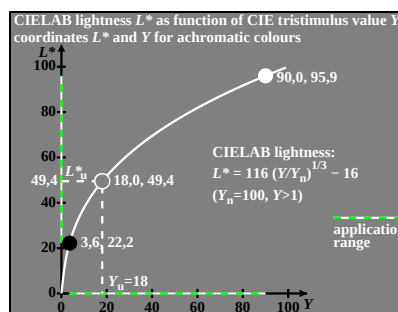
therefore in a log-log diagram the slope is (2/3).

for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:

$$Y/dY = (1/3) (116/Y_n) (Y/Y_n)^{1/3}$$

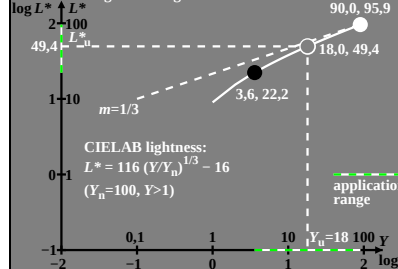
$$\text{or } \log(Y/dY) = \log(1/3) (116/Y_n) + (1/3) \log(Y/Y_n)$$

CIELAB lightness L^* as function of CIE tristimulus value Y coordinates L^* and Y for achromatic colours



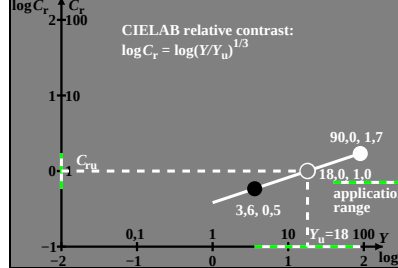
CES00-3N

CIELAB lightness $\log L^*$ as function of $\log Y$ coordinates $\log L^*$ and $\log Y$ for achromatic colours



CES00-5N

$\log C_r = \log [(Y/\Delta Y)/(Y/\Delta Y)_n]$ relative CIE contrast coordinates $\log C_r$ and $\log Y$ for achromatic colours



CES00-7N

CIELAB lightness L^* , CIE tristimulus value discrimination dY and CIE contrast sensitivity (Y/dY)

CIELAB lightness for all colours $L^*_w=100$:

$$L^* = 116 (Y/Y_n)^{1/3} - 16 \quad (Y_n=100, Y>1)$$

For the grey discrimination we get:

$$dL^*/dY = (116/Y_n) (1/3) (Y/Y_n)^{-2/3}$$

and for $dL^*=1$ (about 3 thresholds) we can write:

$$dY = 3 (Y_n/116) (Y/Y_n)^{2/3}$$

$$\text{or } \log(dY) = \log(3 (Y_n/116)) + (2/3) \log(Y/Y_n)$$

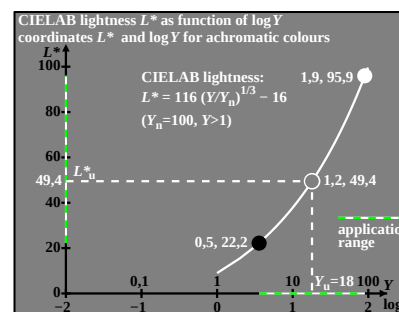
therefore in a log-log diagram the slope is (2/3).

for the CIE contrast sensitivity, and for $dL^*=1$ it is valid:

$$Y/dY = (1/3) (116/Y_n) (Y/Y_n)^{1/3}$$

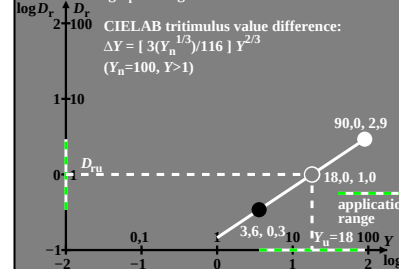
$$\text{or } \log(Y/dY) = \log(1/3) (116/Y_n) + (1/3) \log(Y/Y_n)$$

CIELAB lightness L^* as function of $\log Y$ coordinates L^* and $\log Y$ for achromatic colours



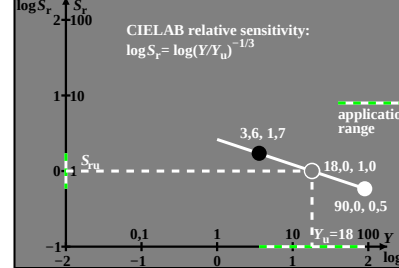
CES00-2N

$\log D_r = \log [\Delta Y/\Delta Y_n]$ relative CIELAB tristimulus value difference coordinates $\log D_r$ and $\log Y$ for achromatic colours



CES00-6N

$\log S_r = \log [(\Delta Y/Y)/(\Delta Y/Y)_n]$ relative CIE sensitivity coordinates $\log S_r$ and $\log Y$ for achromatic colours



CES00-8N

sRGB-triangle lightness T^* , CIE tristimulus value discrimination dY and CIE contrast (Y/dY) sRGB: see IEC 61966-2-1

sRGB-triangle lightness for achromatic colours: W

$$T^*_{sRGB,100} = 100 (Y/Y_n)^{1/2,4} \quad (Y_n=100)$$

For the grey discrimination we get:

$$dT^*_{sRGB,100}/dY = (1/2,4) (Y/Y_n)^{-1,4/2,4} = 0,42 (Y/Y_n)^{-0,58}$$

and for $dT^*_{sRGB,100}=1$ (about 3 thresholds) we can write:

$$dY = 2,4 (Y/Y_n)^{1,4/2,4}$$

$$\text{or } \log(dY) = \log(2,4) + (1,4/2,4) \log(Y/Y_n)$$

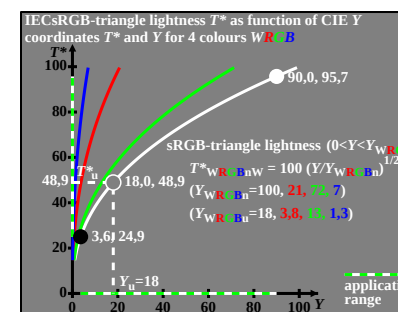
therefore in a log-log diagram the slope is 1,4/2,4.

for the CIE contrast sensitivity, and for $dT^*_{sRGB,100}=1$:

$$Y/dY = (Y_n)^{1,4/2,4} / 2,4 (Y/Y_n)^{1/2,4}$$

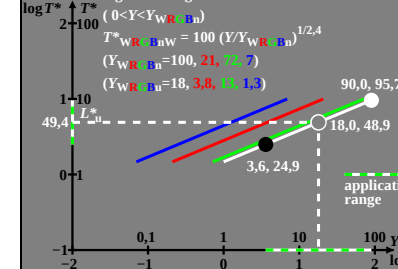
$$\text{or } \log(Y/dY) = \log(Y_n)^{1,4/2,4} / 2,4 + 1/2,4 \log(Y/Y_n)$$

IECsRGB-triangle lightness T^* as function of CIE Y coordinates T^* and Y for 4 colours WRGB



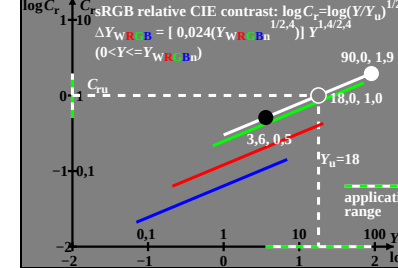
CES01-3N

IECsRGB-triangle lightness $\log T^*$ as function of $\log Y$ coordinates $\log T^*$ and $\log Y$ for 4 colours WRGB



CES01-5N

$\log C_r = \log [(Y/\Delta Y)/(Y/\Delta Y)_n]$ relative CIE contrast coordinates $\log C_r$ and $\log Y$ for 4 colours WRGB



CES01-7N

sRGB-triangle lightness T^* , CIE tristimulus value discrimination dY and CIE contrast (Y/dY) sRGB: see IEC 61966-2-1

sRGB-triangle lightness for achromatic colours: RGB

$$T^*_{sRGB,100} = 100 (Y/Y_n)^{1/2,4} \quad (Y_n=22(R), =71(G), =07(B))$$

For the discrimination we get:

$$dT^*_{sRGB,100}/dY = (1/2,4) (Y/Y_n)^{-1,4/2,4} = 0,42 (Y/Y_n)^{-0,58}$$

and for $dT^*_{sRGB,100}=1$ (about 3 thresholds) we can write:

$$dY = 2,4 (Y/Y_n)^{1,4/2,4}$$

$$\text{or } \log(dY) = \log(2,4) + (1,4/2,4) \log(Y/Y_n)$$

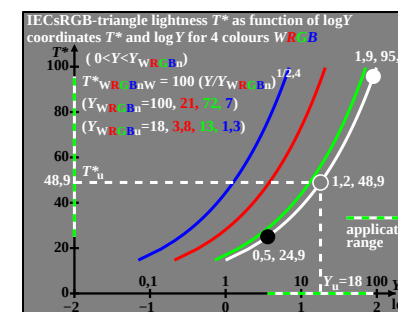
therefore in a log-log diagram the slope is 1,4/2,4.

for the CIE contrast sensitivity, and for $dT^*_{sRGB,100}=1$:

$$Y/dY = (Y_n)^{1,4/2,4} / 2,4 (Y/Y_n)^{1/2,4}$$

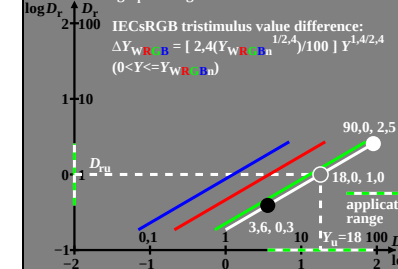
$$\text{or } \log(Y/dY) = \log(Y_n)^{1,4/2,4} / 2,4 + 1/2,4 \log(Y/Y_n)$$

IECsRGB-triangle lightness T^* as function of $\log Y$ coordinates T^* and $\log Y$ for 4 colours WRGB



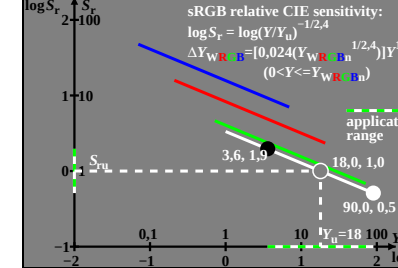
CES01-2N

$\log D_r = \log \Delta Y/\Delta Y_n$ relative IECsRGB tristimulus value difference coordinates $\log D_r$ and $\log Y$ for 4 colours WRGB



CES01-6N

$S_r = \log [(\Delta Y/Y)/(\Delta Y/Y)_n]$ relative CIE sensitivity coordinates $\log S_r$ and $\log Y$ for 4 colours WRGB



CES01-8N