

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:

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

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

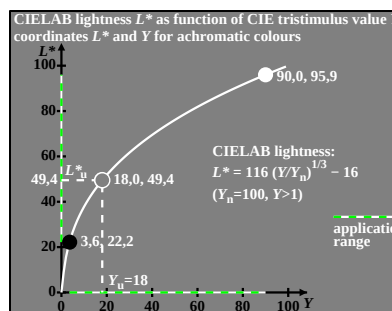
therefore in a log-log diagram the slope is (2/3).

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

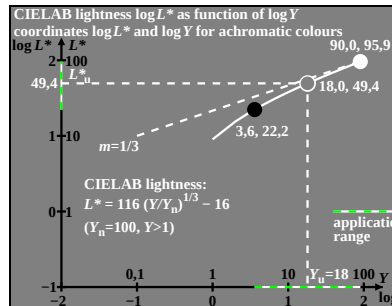
$$Y/dY = (1/3) (116/Y_n) (Y/Y_n)^{1/3}$$

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

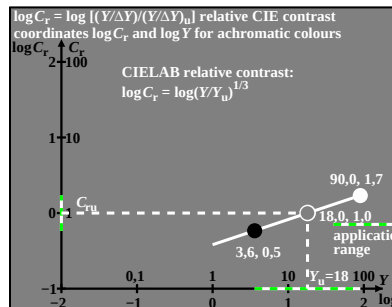
CES00-1N



CES00-3N



CES00-5N



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:

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

$$\text{or } \log(dY) = \log(3(Y_n^{1/3}/116)) + (2/3) \log(Y)$$

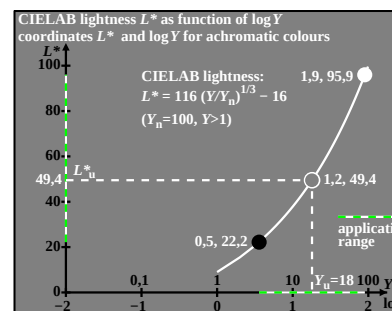
therefore in a log-log diagram the slope is (2/3).

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

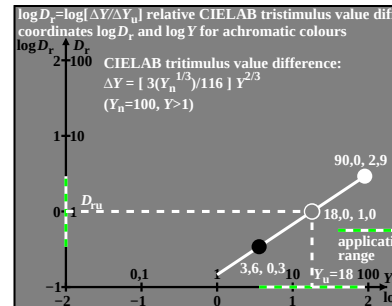
$$Y/dY = (1/3) (116(Y_n^{1/3})) Y^{1/3}$$

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

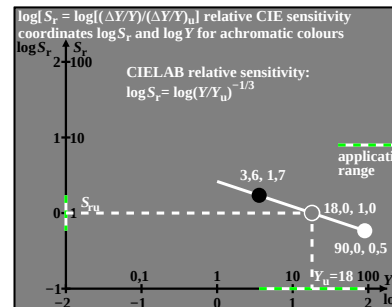
CES00-2N



CES00-4N



CES00-6N



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:

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

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

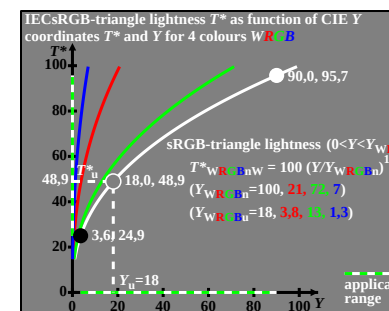
therefore in a log-log diagram the slope is 1,4/2,4.

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

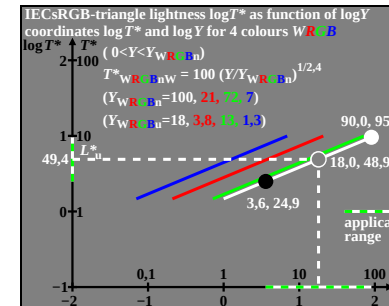
$$Y/dY = (Y_n^{1,4/2,4}/2,4) (Y/Y_n)^{1/2,4}$$

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

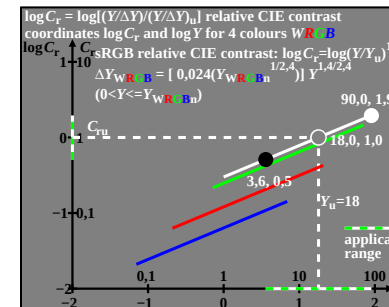
CES01-1N



CES01-3N



CES01-5N



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:

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

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

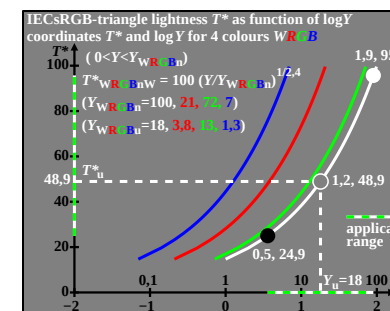
therefore in a log-log diagram the slope is 1,4/2,4.

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

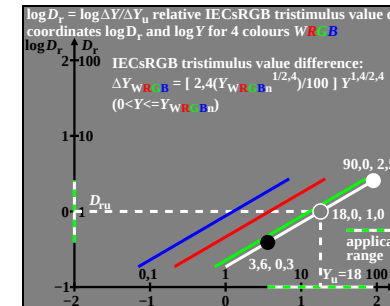
$$Y/dY = (Y_n^{1,4/2,4}/2,4) (Y/Y_n)^{1/2,4}$$

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

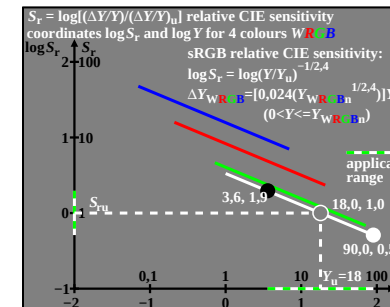
CES01-2N



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CES01-6N



CES01-8N