

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:

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

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:

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

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