see similar files: http://farbe.li.tu-berlin.de/CES0/CES0.HTM
technical information: http://farbe.li.tu-berlin.de or http://color.li.tu-berlin.de

TUB registration: 20220401-CES0/CES0L0N1.TXT /.PS
application for measurement of display output

TUB material: code=ha4ta

LABJND lightness L^*, tristimulus value discrimination dY, contrast $|Y/dY|$, and sensitivity$|dY/Y|$

LABJND lightness for all colours, L^*_n=50 for Y_n=18

$L^* = S_{an}\,(Y_n)^{e0}$ (Y_n=100, $Y > 1$)

For the grey discrimination we get:

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

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

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

CIELAB lightness for all colours L^*_n=100:

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

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

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

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

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

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

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

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

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

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

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:

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

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

sRGB-triangle lightness t^*, CIE tristimulus value discrimination dY and CIE contrast $|Y/dY|$ IEC/CIE: see IEC 61966-2-1

sRGB-triangle lightness for *achromatic* colours: RGB

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

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

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:

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

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