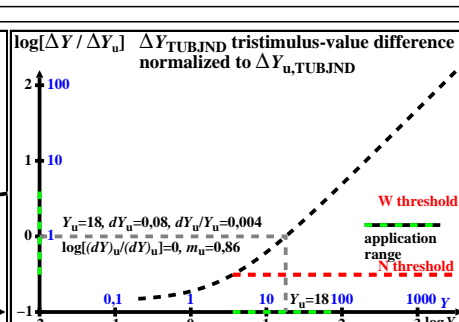
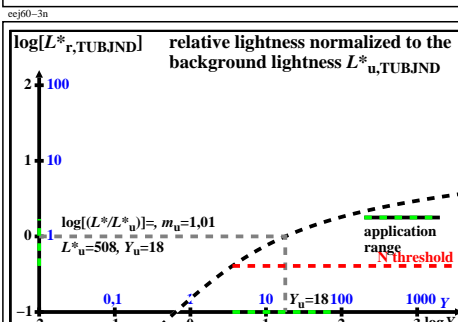
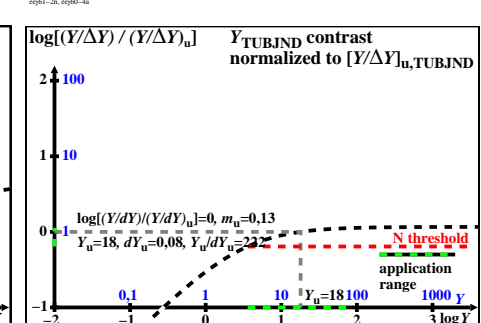
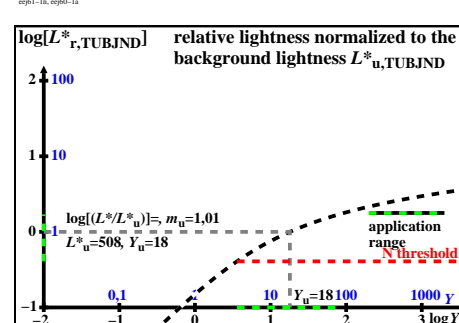
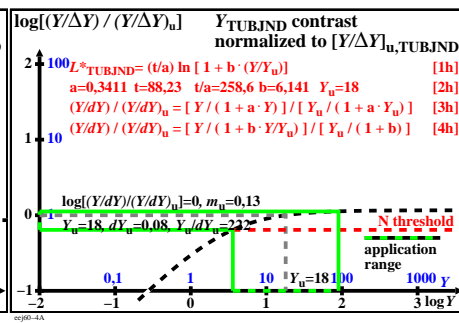
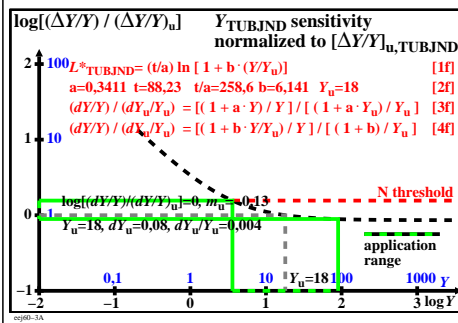
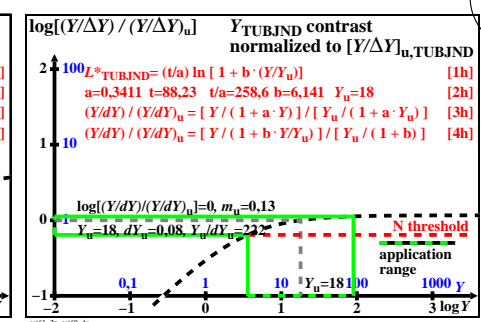
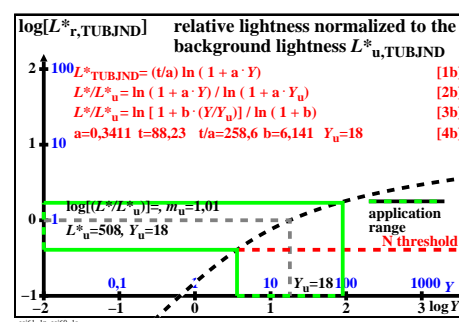
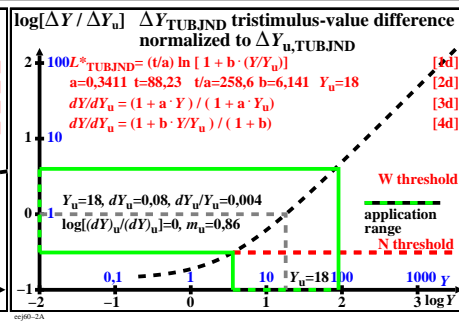
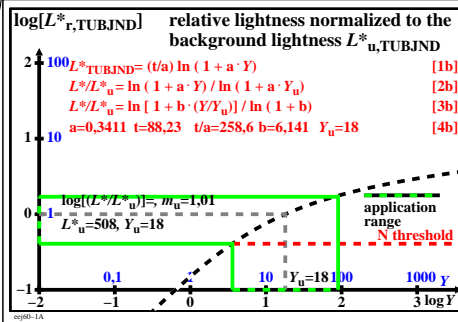


see similar files of the whole serie: <http://farbe.li.tu-berlin.de/eej6/eej6l0na.txt> / .ps
 technical information: <http://farbe.li.tu-berlin.de> OR <http://color.li.tu-berlin.de>

TUB registration: 20230701-eej6/eej6l0na.txt / .ps
 application for evaluation and measurement of display or print output
 TUB material: code=rhatha



Lightness L^* and differences ΔY or dY in the colour space TUBJND

The lightness L^* is defined by the equation:

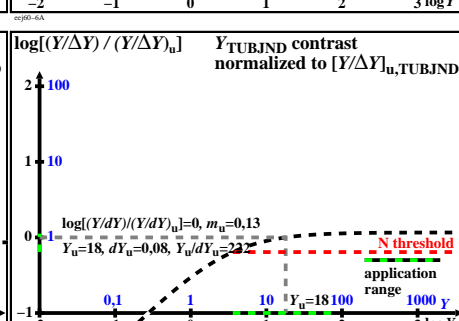
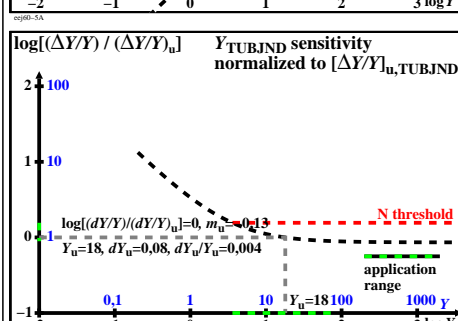
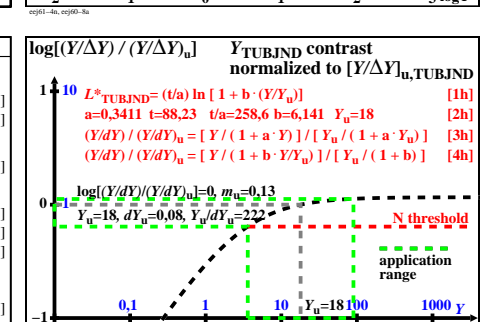
$L^*_{TUBJND} = (t/a) \ln(1+a \cdot Y) = (t/a) \ln(1+b \cdot (Y/Y_u))$ [1]
 $a=0,3411 \quad t=88,23 \quad t/a=258,6 \quad b=6,141 \quad Y_u=18$ [2]

This equation is based on psychophysical BAM-research results
 $dY = (s+q \cdot Y) / c$, see Richter BAM-Forschungsbericht 115, 1985 [3]

There are different versions of this equations, all with equal content
 $dY = (A_1 + A_2 \cdot Y) / A_0$, see CIE 230; Eq. (A.7a) [4]
 $dY = (1+a \cdot Y) / t = (1+b \cdot (Y/Y_u)) / t$ [5]
 $A_1=s=0,0170 \quad A_2=q=0,0058 \quad A_0=c=1,5$ (c=scaling constant) [6]

The lightness L^* is called the line element of dY , see the equation

$L^*_{TUBJND}(Y) = \int \frac{t \cdot dY}{1+a \cdot Y} = (t/a) \ln(1+a \cdot Y)$ [7]



Line-element examples for grey samples ($0.2 \leq x = Y/Y_u \leq 5$)

$F(x)$ is called the line-element function of $f(x)$.
 The following relations are valid for $x=Y/Y_u=1/18$:

$\frac{d[F(x)]}{dx} = f(x)$ [1]
 $F(x) = \int \frac{f'(x)}{f(x)} dx$ [2]

Example for all normalized tristimulus values $x=Y/Y_u$,
 for example for $Y_N=3,6, Y_u=18, Y_W=90$.

$\frac{d[\ln(1+b \cdot x)]}{dx} = \frac{tb}{1+b \cdot x}$ [3]
 $\ln(1+b \cdot x) = \int \frac{tb}{1+b \cdot x} dx$ [4]

