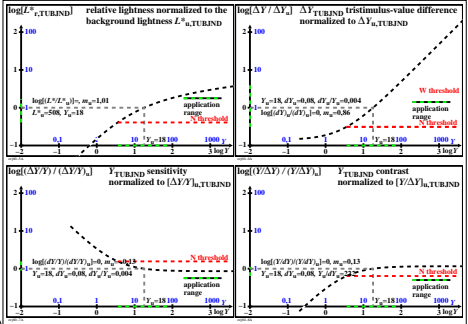
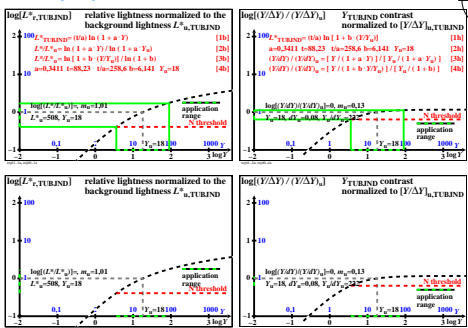
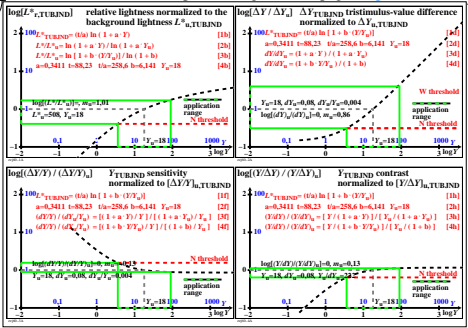


see similar files of the whole series: <http://farbe.li.tu-berlin.de/eefj6/eefj6l1n1.txt>
 technical information: <http://farbe.li.tu-berlin.de> or <http://color.li.tu-berlin.de>



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

The lightness L^* is defined by the equation:
 $L^*_{TUBJND} = (0a) \ln[1 + a \cdot Y] = (0a) \ln[1 + b \cdot (Y/Y_u)]$ (1)
 $a=0.3411, b=88.23, 0a=258.6, b=6.141, Y_u=18$ (1d)

This equation is based on psychophysical BAM-research results
 $dY = (a + q \cdot Y) \cdot E$ see Richter BAM-Forschungsbericht 115, 1985 (3)

There are different versions of this equation, all with equal content
 $dY = (A_1 + A_2 \cdot Y)/A_0$ see CIE 230:2019, Eq. (A.7a) (4)
 $dY = (1 + a \cdot Y)/(1 + b \cdot (Y/Y_u)) \cdot E$ (5)
 $A_1=0.0170, A_2=q=0.0058, A_0=q=1.5$ (rescaling constant) (6)

The lightness L^* is called the line element of dY , see the equation
 $L^*_{TUBJND}(Y) = \int \frac{dY}{1 + a \cdot Y} = (0a) \ln[1 + a \cdot Y]$ (7)

Line-element examples for grey samples (0.25 ≤ x = Y/Y_u ≤ 5)

$F(x)$ is called the line-element function of $f(x)$.
 The following relations are valid for $x=Y/Y_u=1/18$:
 $\frac{dF(x)}{dx} = f(x)$ (1)
 $F(x) = \int \frac{f(x)}{f(x)} dx$ (2)

Example for all normalized tristimulus values $x=Y/Y_u$,
 for example for $Y_u=3.6, Y_u=18, Y_u=90$.
 $\frac{d(\ln(1+bx))}{dx} = \frac{1b}{1+bx}$ (3)
 $\ln(1+bx) = \int \frac{1b}{1+bx} dx$ (4)

TUB registration: 20230701-eefj6/eefj6l1n1.txt /ps
 application for evaluation and measurement of display or print output
 TUB material: code=hb4ta