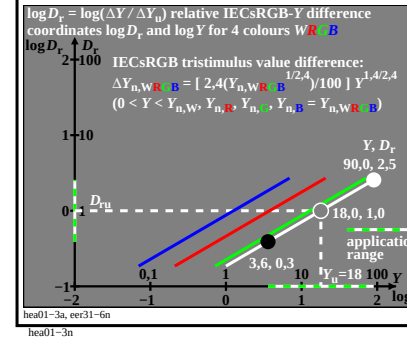
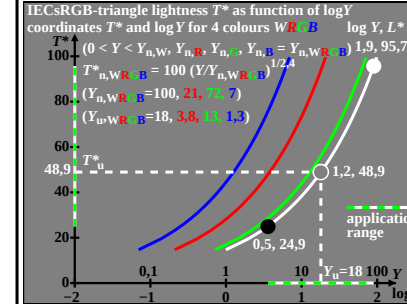
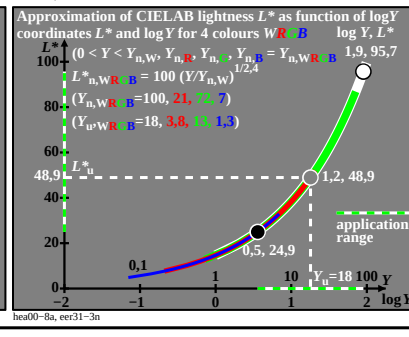
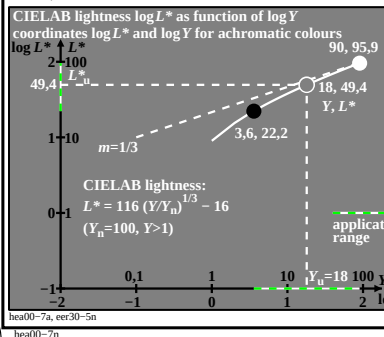
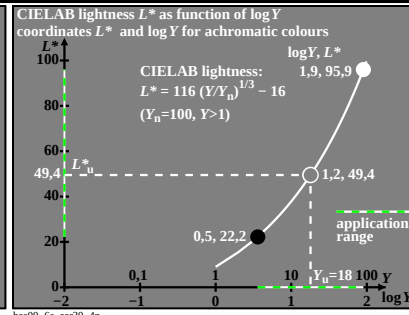
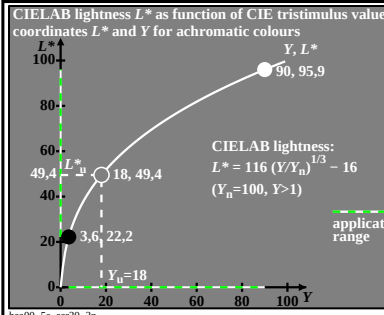
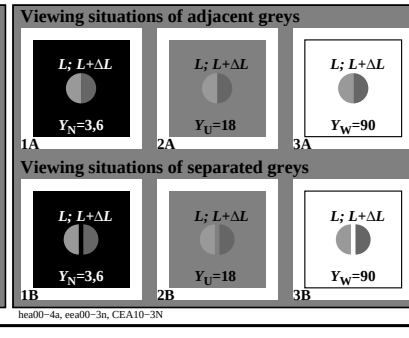
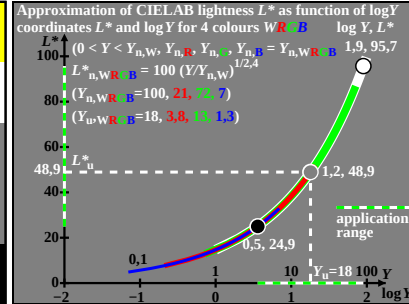
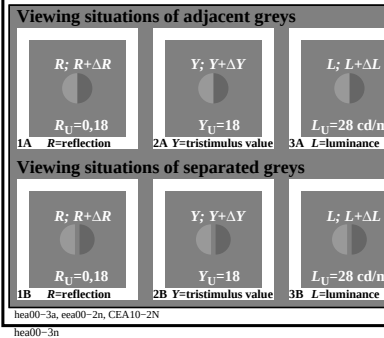


sensation scaling functions
lightness L^* and tristimulus value Y
adaptation on surround white W
 $L^*_W = 100 (Y / 100)^{1/2,0}$
adaptation on surround grey U
 $L^*_{IECsRGB} = 100 (Y / 100)^{1/2,4}$
description with CIELAB 1976
 $L^*_{CIELAB} = 116 (Y / 100)^{1/3,0} - 16$
adaptation on surround black N
 $L^*_N = 100 (Y / 100)^{1/3,0}$



CIELAB lightness L^* , tristimulus value discrimination dY , contrast (Y/dY) , and sensitivity (dY/Y)

CIELAB lightness for all colours, $L^*_n=50$ for $Y_n=18$
 $L^* = 66 (Y/Y_n)^{1/3} - 16$ ($Y_n=18$, $Y>1$)

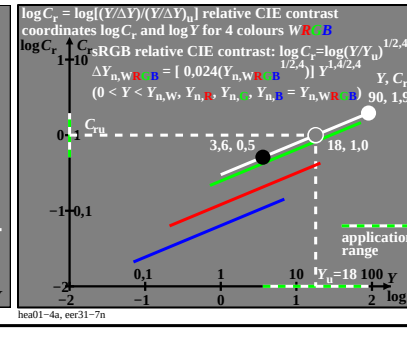
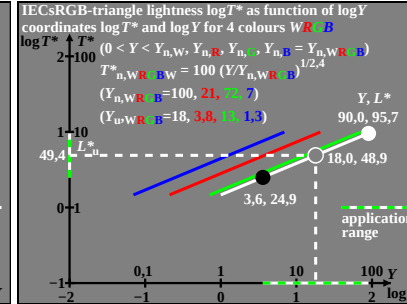
For the grey discrimination we get:
 $dL^*/dY = (66/Y_n) (1/3) (Y/Y_n)^{-2/3}$
and for $dL^*=1$ (about 3 thresholds) we can write:
 $dY = 3 (Y_n/66) (Y/Y_n)^{2/3}$
or $\log(dY) = \log(3 (Y_n/66)) + (2/3) \log(Y/Y_n)$
therefore in a log-log diagram the slope is (2/3).
for the CIE contrast sensitivity, and for $dL^* = 1$ it is valid:
 $Y/dY = (1/3) (66/Y_n) (Y/Y_n)^{1/3}$
or $\log(Y/dY) = \log(1/3) (66/Y_n) + (1/3) \log(Y/Y_n)$

hea01-5a, eea30-1n

IECsRGB-triangle lightness T^* , CIE tristimulus value discrimination dY and CIE contrast (Y/dY) sRGB: see IEC 61966-2-1
 $T^*_{sRGB,100} = 100 (Y/Y_n)^{1/2,4}$ is an approximation of L^*_{CIELAB}
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 $\log(Y/dY) = \log(Y_n)^{1,4/2,4} / 2,4 + 1/2,4 \log(Y/Y_n)$

hea01-7a, eea31-1n
hea01-7n



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

CIELAB lightness for all colours, $L^*_n=100$ for $Y_n=100$
 $L^* = 116 (Y/Y_n)^{1/3} - 16$ ($Y_n=100$, $Y>1$)

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

hea01-6a, eea30-2n

IECsRGB-triangle lightness T^* , CIE tristimulus value discrimination dY and CIE contrast (Y/dY) sRGB: see IEC 61966-2-1
 $T^*_{sRGB,100} = 100 (Y/Y_n)^{1/2,4}$ is an approximation of L^*_{CIELAB}
sRGB-triangle lightness for chromatic 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 $\log(Y/dY) = \log(Y_n)^{1,4/2,4} / 2,4 + 1/2,4 \log(Y/Y_n)$

hea01-8a, eea31-2n