$\ln(L^*/L^*_u)$ — TUBsRGB lightness L^* normalized to the background lightness L^*_u

L^*/L^*_u

$L^* = s\,(Y/Y_n)^n - t$ (Y_n=100, s=100, n=(1/ln(10)), t=0) [1b]

$L^* = r\,(Y/Y_u)^n - t$ (Y_u=18, r=s(Y_u/Y_n)^n = 47,45) [1c]

$L^*/L^*_u = (Y/Y_u)^{1/\ln(10)}$ (ln(x)=ln(10) log(x)) [1d]

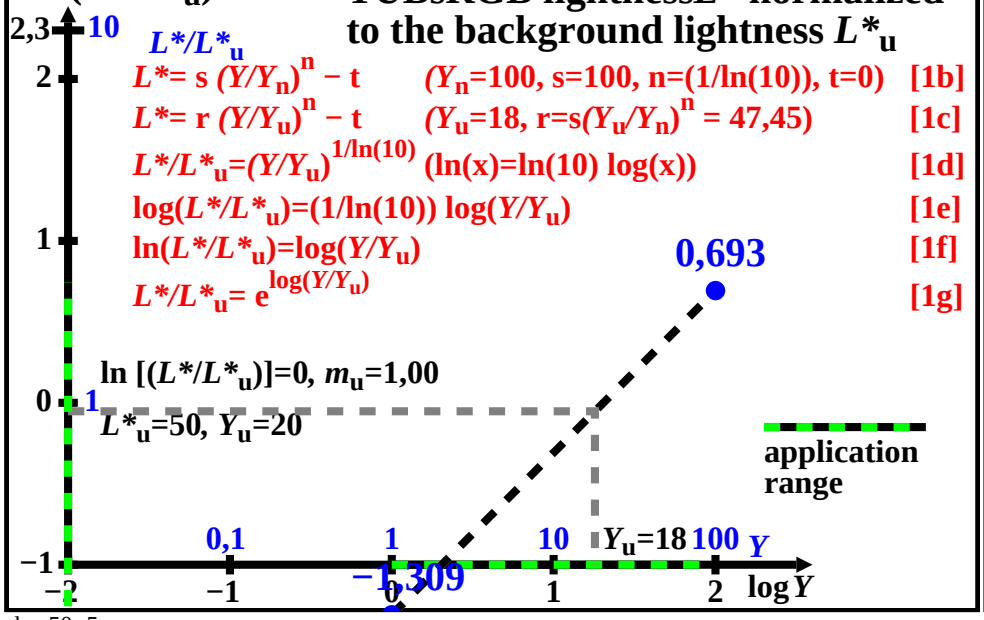
$\log(L^*/L^*_u) = (1/\ln(10))\,\log(Y/Y_u)$ [1e]

$\ln(L^*/L^*_u) = \log(Y/Y_u)$ [1f]

$L^*/L^*_u = e^{\log(Y/Y_u)}$ [1g]

$\ln[(L^*/L^*_u)]=0$, m_u=1,00

L^*_u=50, Y_u=20



hec50−5a

$\log(\Delta Y/\Delta Y_u)$ — CIE tristimulus value difference ΔY normalized to ΔY_u

$\Delta Y/\Delta Y_u$

$L^* = 100\,(Y/Y_n)^{1/\ln(10)}$ (Y_n=100, Y_u=18, 1≤ Y ≤100) [1d]

$dY = (2{,}4Y_n/100)\cdot(Y/Y_n)^{(\ln(10)-1)/\ln(10)}$ [2d]

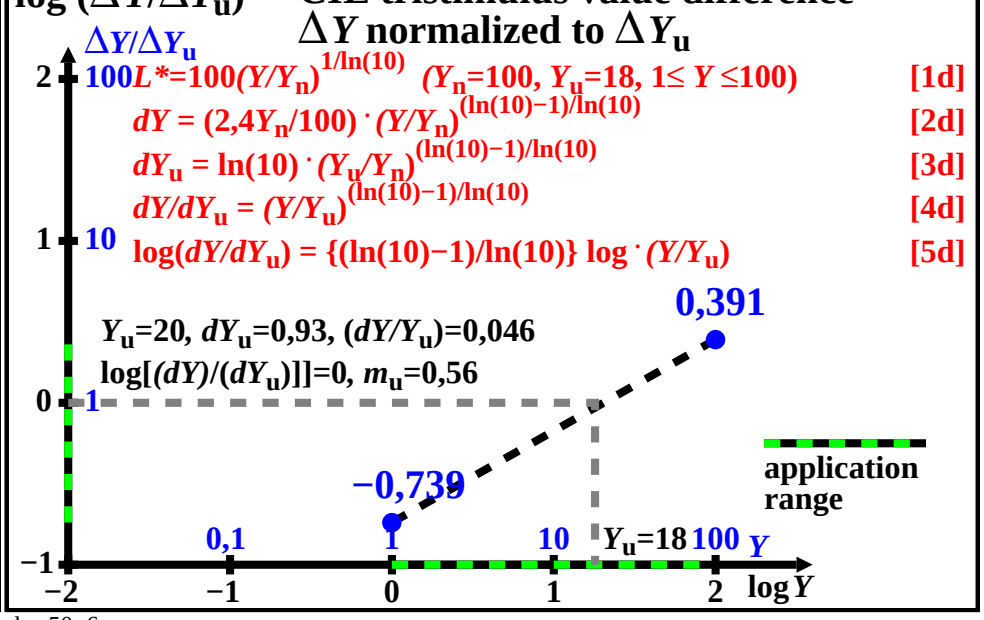
$dY_u = \ln(10)\cdot(Y_u/Y_n)^{(\ln(10)-1)/\ln(10)}$ [3d]

$dY/dY_u = (Y/Y_u)^{(\ln(10)-1)/\ln(10)}$ [4d]

$\log(dY/dY_u) = \{(\ln(10)-1)/\ln(10)\}\,\log\cdot(Y/Y_u)$ [5d]

Y_u=20, dY_u=0,93, (dY/Y_u)=0,046

$\log[(dY)/(dY_u)]]=0$, m_u=0,56



hec50−6a

$\log[(\Delta Y/Y)/(\Delta Y/Y)_u]$ — CIE Y sensitivity normalized to $\Delta Y_u/Y_u$

$S_r/S_{ru} = (\Delta Y/Y)/(\Delta Y/Y)_u$

$L^* = 100\,(Y/Y_n)^{1/\ln(10)}$ (Y_n=100, Y_u=18, 1≤ Y ≤100) [1f]

$dY/Y = (2{,}3/100)\cdot(Y/Y_n)^{1{,}3/2{,}3}$ [2f]

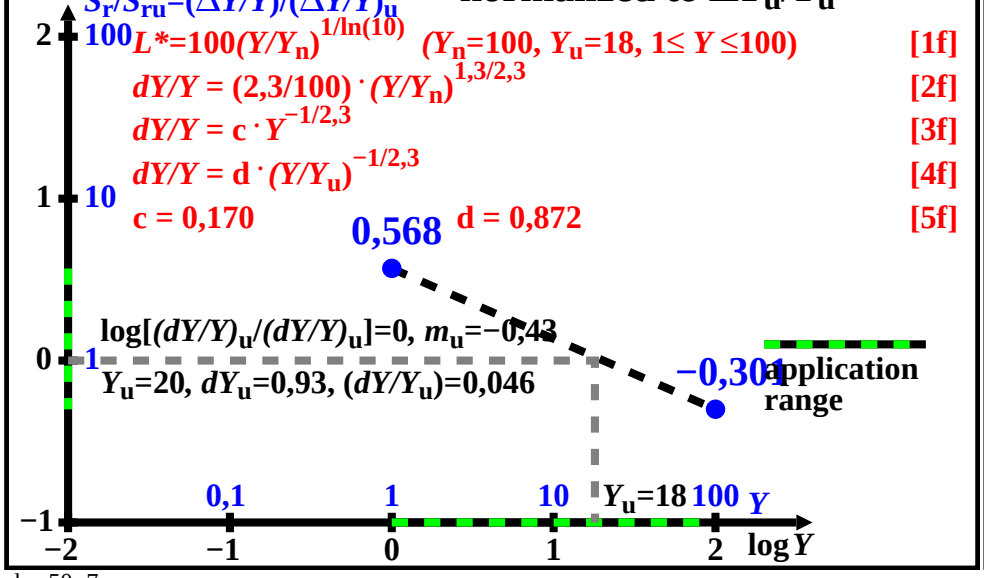
$dY/Y = c\cdot Y^{-1/2{,}3}$ [3f]

$dY/Y = d\cdot(Y/Y_u)^{-1/2{,}3}$ [4f]

c = 0,170 d = 0,872 [5f]

$\log[(dY/Y)_u/(dY/Y)_u]=0$, m_u=−0,43

Y_u=20, dY_u=0,93, (dY/Y_u)=0,046



hec50−7a

$\log[(Y/\Delta Y)/(Y/\Delta Y)_u)]$ — CIE Y-based contrast normalized to $Y_u/\Delta Y_u$

$C_r/C_{ru} = (Y/\Delta Y)/(Y/\Delta Y)_u$

$L^* = 100\,(Y/Y_n)^{1/\ln(10)}$ (Y_n=100, Y_u=18, 1≤ Y ≤100) [1h]

$Y/dY = (2{,}3/100)\cdot Y_n^{1/2{,}3}\,Y^{1{,}3/2{,}3}$ [2h]

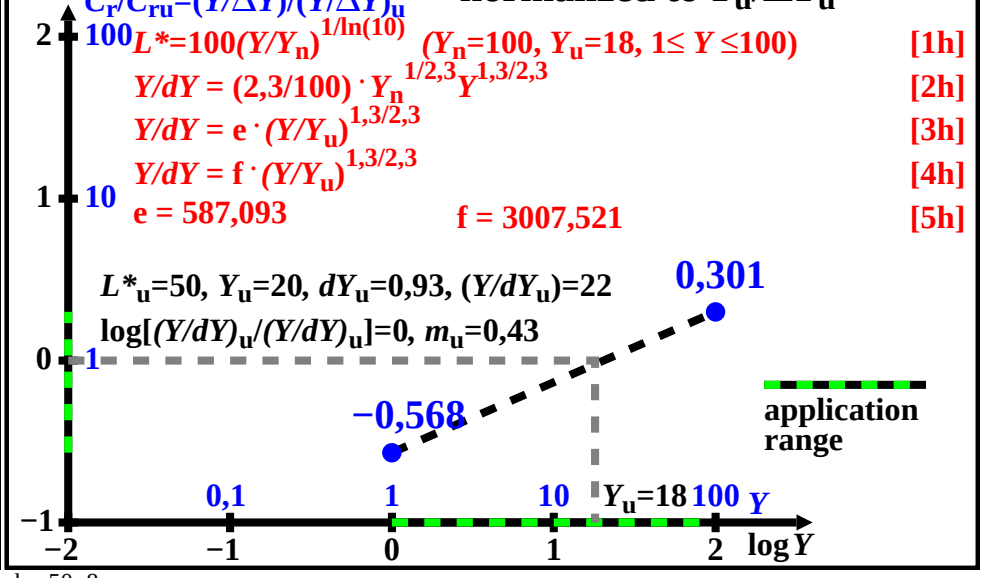
$Y/dY = e\cdot(Y/Y_u)^{1{,}3/2{,}3}$ [3h]

$Y/dY = f\cdot(Y/Y_u)^{1{,}3/2{,}3}$ [4h]

e = 587,093 f = 3007,521 [5h]

L^*_u=50, Y_u=20, dY_u=0,93, (Y/dY_u)=22

$\log[(Y/dY)_u/(Y/dY)_u]=0$, m_u=0,43



hec50−8a

hec50−7n