

L^* and
 L^*/L^*_u

TUBsRGB lightness L^* normalized
to the background lightness L^*_u

text lightness

$$L^* = s (Y/Y_n)^n - d \quad (Y_n=100, Y_u=18, s=100, n=1/\ln(10), d=0) \quad [1a]$$

$$L^* = r (Y/Y_u)^n - d \quad (r = s (Y_u/Y_n)^n = 47,48, L^*_u = r - d) \quad [1b]$$

text relative lightness

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

text $\log(L^*/L^*_u)$

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

text $\ln(L^*/L^*_u)$

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

text $L^*/L^*_u = e^{**x}$

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