

$(\Delta Y/Y)$  and LABJND- $Y$  sensitivity  
 $(\Delta Y/Y) / (\Delta Y/Y)_u$  normalized to  $(\Delta Y/Y)_u$

text lightness

$$L^*/L^*_u = (t/a) \{ \ln(1 + a \cdot Y) - \ln(1 + a \cdot Y_u) \} \quad [1a]$$

$$L^*/L^*_u = (t/a) \{ \ln[1 + b \cdot (Y/Y_u)] - \ln(1 + b) \} \quad [1b]$$

text relative lightness

$$\text{tristimulus value } Y \text{ sensitivity} \quad [3c]$$

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

$$(dY/Y) / (dY/Y)_u = [ (Y_n / (n \cdot s)) (Y/Y_u)^{1-n} / Y ] / [ (1 + a \cdot Y_u) / Y_u ] \quad [3f]$$

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

$(\Delta Y/Y)$  and CIELAB- $Y$  sensitivity  
 $(\Delta Y/Y) / (\Delta Y/Y)_u$  normalized to  $(\Delta Y/Y)_u$

text lightness

$$L^* = s (Y/Y_n)^n - d \quad (Y_n=100, Y_u=18, s=116, n=1/3, d=16) \quad [1a]$$

$$L^* = r (Y/Y_u)^n - d \quad (r = s (Y_u/Y_n)^n = 65,49, L^*_u = r - d) \quad [1b]$$

text relative lightness

$$dY/Y = [ (Y_n / (n \cdot s)) (Y/Y_n)^{1-n} / Y ] \quad [3c]$$

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

$$(dY/Y)_u = [ (Y_n / (n \cdot s)) (Y_u/Y_n)^{1-n} / Y_u ] \quad [3d]$$

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

$$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{-n} \quad [3e]$$

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

$$\log [(dY/Y) / (dY/Y)_u] = (-n) \log(Y/Y_u) \quad [3f]$$

hep21-1a

hep21-2a

$(\Delta Y/Y)$  and IECsRGB- $Y$  sensitivity  
 $(\Delta Y/Y) / (\Delta Y/Y)_u$  normalized to  $(\Delta Y/Y)_u$

text lightness

$$L^* = s (Y/Y_n)^n - d \quad (Y_n=100, Y_u=18, s=100, n=1/2,4, d=0) \quad [1a]$$

$$L^* = r (Y/Y_u)^n - d \quad (r = s (Y_u/Y_n)^n = 48,94, L^*_u = r - d) \quad [1b]$$

text relative lightness

$$dY/Y = [ (Y_n / (n \cdot s)) (Y/Y_n)^{1-n} / Y ] \quad [3c]$$

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

$$(dY/Y)_u = [ (Y_n / (n \cdot s)) (Y_u/Y_n)^{1-n} / Y_u ] \quad [3d]$$

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

$$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{-n} \quad [3e]$$

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

$$\log [(dY/Y) / (dY/Y)_u] = (-n) \log(Y/Y_u) \quad [3f]$$

hep21-3a

$(\Delta Y/Y)$  and TUBsRGB- $Y$  sensitivity  
 $(\Delta Y/Y) / (\Delta Y/Y)_u$  normalized to  $(\Delta Y/Y)_u$

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

$$dY/Y = [ (Y_n / (n \cdot s)) (Y/Y_n)^{1-n} / Y ] \quad [3c]$$

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

$$(dY/Y)_u = [ (Y_n / (n \cdot s)) (Y_u/Y_n)^{1-n} / Y_u ] \quad [3d]$$

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

$$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{-n} \quad [3e]$$

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

$$\log [(dY/Y) / (dY/Y)_u] = (-n) \log(Y/Y_u) \quad [3f]$$

hep21-4a

hep21-3n