**$L^*_{85,2}$ and $L^*_{85,2}/L^*_{85,2,u}$ — LABJND lightness $L^*_{85,2}$ normalized to the background lightness $L^*_{85,2,u}$**

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

text relative lightness
- a=0,3411 t=88,23 t/a=258,6 b=6,141 [1c]

text log(L*/L*u)

text ln(L*/Lu)

text L*/L*u=e**x

hep20−1a

**$L^*$ and $L^*/L^*_u$ — CIELAB lightness $L^*$ normalized to the background lightness $L^*_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=116, n=1/3, d=16) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=65,49, $L^*_u$= r − d) [1b]

text relative lightness
- $L^*/L^*_u = g\ (Y/Y_u)^n - h$ (g=r/(r−d)=1,32, h=d/(r−d)=0,32) [1c]

text log(L*/L*u)
- $\log [(L^*/L^*_u + h) / g ] = n \log (Y/Y_u)$ [1d]

text ln(L*/Lu)
- $\ln [(L^*/L^*_u + h) / g ] = \ln(10)\ n \log (Y/Y_u)$ [1e]

text L*/L*u=e**x
- $(L^*/L^*_u + h) / g ] = e^{\ln(10)\ n \log (Y/Y_u)}$ [1f]

hep20−2a

**$L^*$ and $L^*/L^*_u$ — IECsRGB lightness $L^*$ normalized to the background lightness $L^*_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/2,4, d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=48,94, $L^*_u$= r − d) [1b]

text relative lightness
- $L^*/L^*_u = (Y/Y_u)^n$ [1c]

text log(L*/L*u)
- $\log (L^*/L^*_u) = n \log (Y/Y_u)$ [1d]

text ln(L*/Lu)
- $\ln (L^*/L^*_u) = \ln(10)\ n \log (Y/Y_u)$ [1e]

text L*/L*u=e**x
- $L^*/L^*_u = e^{\ln(10)\ n \log (Y/Y_u)}$ [1f]

hep20−3a

**$L^*$ and $L^*/L^*_u$ — TUBsRGB lightness $L^*$ normalized to the background lightness $L^*_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/ln(10), d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=47,48, $L^*_u$= r − d) [1b]

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

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

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

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

hep20−4a

hep20−3n

**$\Delta Y$ and $\Delta Y/\Delta Y_u$ — LABJND tristimulus value difference $\Delta Y$ normalized to $\Delta Y_u$**

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

text relative lightness
- normalized tristimulus value $Y$ difference [3e]

text log(L*/L*u)
- $dY/dY_u = (1 + a \cdot Y) / ( 1 + a \cdot Y_u)$ [3d]

text ln(L*/Lu)

text L*/L*u=e**x

hep20−5a

**$\Delta Y$ and $\Delta Y/\Delta Y_u$ — CIELAB tristimulus value difference $\Delta Y$ normalized to $\Delta Y_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=116, n=1/3, d=16) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=65,49, $L^*_u$= r − d) [1b]

text relative lightness
- $dY = [Y_n/ ( n\ s )]\ (Y / Y_n)^{1-n}$ [2c]

text log(L*/L*u)
- $dY_u = [Y_n/ ( n\ s )]\ (Y_u / Y_n)^{1-n} = 1{,}4602$ [2d]

text ln(L*/Lu)
- $dY / dY_u = (Y / Y_u)^{1-n}$ [2e]

text L*/L*u=e**x
- $\log(dY / dY_u) = (1-n)\ \log(Y / Y_u)$ [2f]

hep20−6a

**$\Delta Y$ and $\Delta Y/\Delta Y_u$ — IECsRGB tristimulus value difference $\Delta Y$ normalized to $\Delta Y_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/2,4, d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=48,94, $L^*_u$= r − d) [1b]

text relative lightness
- $dY = [Y_n/ ( n\ s )]\ (Y / Y_n)^{1-n}$ [2c]

text log(L*/L*u)
- $dY_u = [Y_n/ ( n\ s )]\ (Y_u / Y_n)^{1-n} = 1{,}1746$ [2d]

text ln(L*/Lu)
- $dY / dY_u = (Y / Y_u)^{1-n}$ [2e]

text L*/L*u=e**x
- $\log(dY / dY_u) = (1-n)\ \log(Y / Y_u)$ [2f]

hep20−7a

**$\Delta Y$ and $\Delta Y/\Delta Y_u$ — TUBsRGB tristimulus value difference $\Delta Y$ normalized to $\Delta Y_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/ln(10), d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=47,48, $L^*_u$= r − d) [1b]

text relative lightness
- $dY = [Y_n/ ( n\ s )]\ (Y / Y_n)^{1-n}$ [2c]

text log(L*/L*u)
- $dY_u = [Y_n/ ( n\ s )]\ (Y_u / Y_n)^{1-n} = 1{,}0934$ [2d]

text ln(L*/Lu)
- $dY / dY_u = (Y / Y_u)^{1-n}$ [2e]

text L*/L*u=e**x
- $\log(dY / dY_u) = (1-n)\ \log(Y / Y_u)$ [2f]

hep20−8a

hep20−7n

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

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

text relative lightness
- tristimulus value $Y$ sensitivity [3c]

text log(L*/L*u)
- $(dY/Y)_u = [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} / Y_u$ [3d]

text ln(L*/Lu)

text L*/L*u=e**x

hep21−1a

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

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=116, n=1/3, d=16) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=65,49, $L^*_u$= r − d) [1b]

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

text log(L*/L*u)
- $(dY / Y)_u = [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} / Y_u$ [3d]

text ln(L*/Lu)
- $(dY / Y) / (dY / Y)_u = (Y / Y_u)^{-n}$ [3e]

text L*/L*u=e**x
- $\log [(dY / Y) / (dY / Y)_u] = (-n)\ \log(Y / Y_u)$ [3f]

hep21−2a

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

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/2,4, d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=48,94, $L^*_u$= r − d) [1b]

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

text log(L*/L*u)
- $(dY / Y)_u = [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} / Y_u$ [3d]

text ln(L*/Lu)
- $(dY / Y) / (dY / Y)_u = (Y / Y_u)^{-n}$ [3e]

text L*/L*u=e**x
- $\log [(dY / Y) / (dY / Y)_u] = (-n)\ \log(Y / Y_u)$ [3f]

hep21−3a

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

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/ln(10), d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=47,48, $L^*_u$= r − d) [1b]

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

text log(L*/L*u)
- $(dY / Y)_u = [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} / Y_u$ [3d]

text ln(L*/Lu)
- $(dY / Y) / (dY / Y)_u = (Y / Y_u)^{-n}$ [3e]

text L*/L*u=e**x
- $\log [(dY / Y) / (dY / Y)_u] = (-n)\ \log(Y / Y_u)$ [3f]

hep21−4a

hep21−3n

**$(Y/\Delta Y)$ and $(Y/\Delta Y) / (Y/\Delta Y)_u$ — LABJND-$Y$ contrast normalized to $(Y/\Delta Y)_u$**

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

text relative lightness
- tristimulus value $Y$ contrast [4c]

text log(L*/L*u)
- $(Y/dY) / (Y_u dY_u)$ [4d]

text ln(L*/Lu)
- $= [ Y / ( 1 + a \cdot Y) ] / [ Y_u / ( 1 + a \cdot Y_u) ]$ [4e]

text L*/L*u=e**x

hep21−5a

**$(Y/\Delta Y)$ and $(Y/\Delta Y) / (Y/\Delta Y)_u$ — CIELAB-$Y$ contrast normalized to $(Y/\Delta Y)_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=116, n=1/3, d=16) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=65,49, $L^*_u$= r − d) [1b]

text relative lightness
- $Y / dY = Y / \{ [ (Y_n/ ( n\ s ) ]\ (Y / Y_n)^{1-n} \}$ [4c]

text log(L*/L*u)
- $(Y / Y)_u = Y_u / \{ [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} \}$ [4d]

text ln(L*/Lu)
- $(Y / dY) / (Y / dY)_u = (Y / Y_u)^n$ [4e]

text L*/L*u=e**x
- $\log [(Y / dY) / (Y / dY)_u] = (n)\ \log(Y / Y_u)$ [4f]

hep21−6a

**$(Y/\Delta Y)$ and $(Y/\Delta Y) / (Y/\Delta Y)_u$ — IECsRGB-$Y$ contrast normalized to $(Y/\Delta Y)_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/2,4, d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=48,94, $L^*_u$= r − d) [1b]

text relative lightness
- $Y / dY = Y / \{ [ (Y_n/ ( n\ s ) ]\ (Y / Y_n)^{1-n} \}$ [4c]

text log(L*/L*u)
- $(Y / Y)_u = Y_u / \{ [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} \}$ [4d]

text ln(L*/Lu)
- $(Y / dY) / (Y / dY)_u = (Y / Y_u)^n$ [4e]

text L*/L*u=e**x
- $\log [(Y / dY) / (Y / dY)_u] = (n)\ \log(Y / Y_u)$ [4f]

hep21−7a

**$(Y/\Delta Y)$ and $(Y/\Delta Y) / (Y/\Delta Y)_u$ — TUBsRGB-$Y$ contrast normalized to $(Y/\Delta Y)_u$**

text lightness
- $L^* = s\ (Y/Y_n)^n - d$ ($Y_n$=100, $Y_u$=18, s=100, n=1/ln(10), d=0) [1a]
- $L^* = r\ (Y/Y_u)^n - d$ (r = s $(Y_u/Y_n)^n$=47,48, $L^*_u$= r − d) [1b]

text relative lightness
- $Y / dY = Y / \{ [ (Y_n/ ( n\ s ) ]\ (Y / Y_n)^{1-n} \}$ [4c]

text log(L*/L*u)
- $(Y / Y)_u = Y_u / \{ [ (Y_n/ ( n\ s ) ]\ (Y_u / Y_n)^{1-n} \}$ [4d]

text ln(L*/Lu)
- $(Y / dY) / (Y / dY)_u = (Y / Y_u)^n$ [4e]

text L*/L*u=e**x
- $\log [(Y / dY) / (Y / dY)_u] = (n)\ \log(Y / Y_u)$ [4f]

hep21−8a

hep21−7n