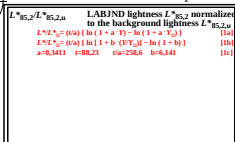
$L^*_{85,2}/L^*_{85,2,u}$ LABJND lightness $L^*_{85,2}$ normalized to the background lightness $L^*_{85,2,u}$

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

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

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



hep00-1a

L^*/L^*_u CIELAB lightness L^* normalized to the background lightness L^*_u

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/3,\ d{=}16)$ [1a]

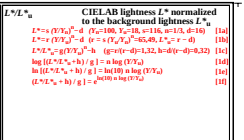
$L^* = s\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} - 65,49,\ L^*_o = r - d)$ [1b]

$L^*/L^*_u = g(Y/Y_u)^{0,43} + h \quad (g = (r-d)\cdot 1,32,\ h = d\cdot(r-d) = 0,32)$ [1c]

$\log\ (L^*/L^*_u \cdot s + h) / g] = s\log(Y/Y_u)$ [1d]

$\ln\ (L^*/L^*_u \cdot s + h) / g] = \ln(10)\cdot s\log(Y/Y_u) = \ln(Y/Y_u)^{s\ln(10)}$ [1e]

$(L^*/L^*_u \cdot s + h) / g] = e^{s\ln(10)} = \log(Y/Y_u)$ [1f]



hep00-2a

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

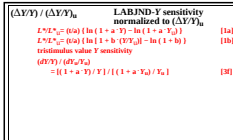
$L^*/L^*_u = (c/a)\ (\ln(1+a\cdot Y) - \ln(1+a\cdot Y_u))$ [1a]

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

tristimulus value Y sensitivity

$(dY/Y) / (dY_u/Y_u)$

$= [(1+a\cdot Y)\cdot Y] / [(1+a\cdot Y_u)\cdot Y_u]$ [3f]



hep01-1a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/3,\ d{=}16)$ [1a]

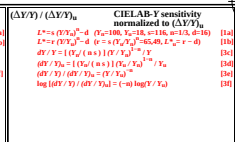
$L^* = s\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} - 65,49,\ L^*_o = r - d)$ [1b]

$dY/Y = [(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]/Y$ [3c]

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

$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{1-a}$ [3e]

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



hep01-2a

L^*/L^*_u IECsRGB lightness L^* normalized to the background lightness L^*_u

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/2.4,\ d{=}9)$ [1a]

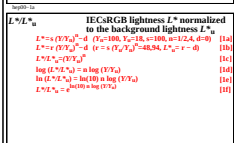
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 48,94,\ L^*_o = r - d)$ [1b]

$L^*/L^*_u = c\ (Y/Y_u)^{0,43}$ [1c]

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

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

$L^*/L^*_u = e^{\ln(10)\cdot s\log\ (Y/Y_u)}$ [1f]



hep00-3a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/\ln(10),\ d{=}0)$ [1a]

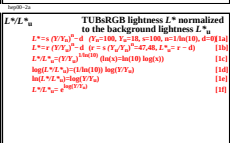
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 47,48,\ L^*_o = r - d)$ [1b]

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

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

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

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



hep00-4a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/2.4,\ d{=}0)$ [1a]

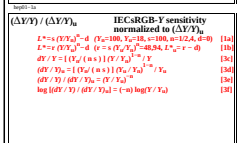
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 48,94,\ L^*_o = r - d)$ [1b]

$dY/Y = [(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]/Y$ [3c]

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

$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{1-a}$ [3e]

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



hep01-3a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/\ln(10),\ d{=}0)$ [1a]

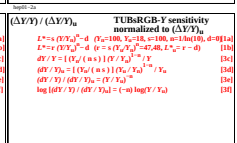
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 47,48,\ L^*_o = r - d)$ [1b]

$dY/Y = [(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]/Y$ [3c]

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

$(dY/Y) / (dY/Y)_u = (Y/Y_u)^{1-a}$ [3e]

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



hep01-4a

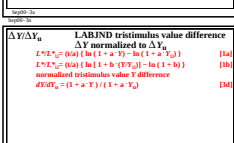
$\Delta Y/\Delta Y_u$ LABJND tristimulus value difference ΔY normalized to ΔY_u

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

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

normalized tristimulus value Y difference

$dY/dY_u = (1+a\cdot Y)/(1+a\cdot Y_u)$ [3d]



hep00-5a

$\Delta Y/\Delta Y_u$ CIELAB tristimulus value difference ΔY normalized to ΔY_u

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/3,\ d{=}16)$ [1a]

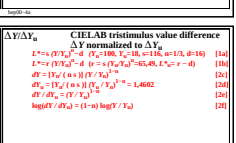
$L^* = s\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 65,49,\ L^*_o = r - d)$ [1b]

$dY = [Y_u/(a\cdot s)]\ (Y/Y_u)^{1-a}$ [2c]

$dY_u = [Y_u/(a\cdot s)]\ (Y_u/Y_u)^{1-a} = 1,4602$ [2d]

$dY/dY_u = (Y/Y_u)^{1-a}$ [2e]

$\log(dY/dY_u) = (1-a)\log(Y/Y_u)$ [2f]



hep00-6a

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

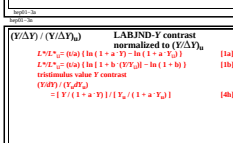
$L^*/L^*_u = (c/a)\ (\ln(1+a\cdot Y) - \ln(1+a\cdot Y_u))$ [1a]

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

tristimulus value Y contrast

$(Y/dY) / (Y_u/dY_u)$

$= [Y/(1+a\cdot Y)] / [Y_u/(1+a\cdot Y_u)]$ [4h]



hep01-5a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/3,\ d{=}16)$ [1a]

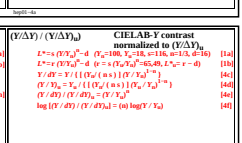
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 65,49,\ L^*_o = r - d)$ [1b]

$Y/dY = Y/[(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]$ [4c]

$(Y/Y)_u = Y_u/((Y_u/(a\cdot s))\ (Y_u/Y_u)^{1-a})$ [4d]

$(Y/dY)_u = (Y/dY)/(Y_u/dY_u) = (Y/Y_u)^a$ [4e]

$\log[(Y/dY)/(Y/dY)_u] = (a)\log(Y/Y_u)$ [4f]



hep01-6a

$\Delta Y/\Delta Y_u$ IECsRGB tristimulus value difference ΔY normalized to ΔY_u

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/2.4,\ d{=}9)$ [1a]

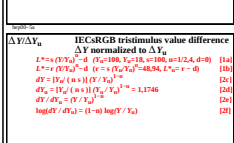
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 48,94,\ L^*_o = r - d)$ [1b]

$dY = [Y_u/(a\cdot s)]\ (Y/Y_u)^{1-a}$ [2c]

$dY_u = [Y_u/(a\cdot s)]\ (Y_u/Y_u)^{1-a} = 1,7746$ [2d]

$dY/dY_u = (Y/Y_u)^{1-a}$ [2e]

$\log(dY/dY_u) = (1-a)\log(Y/Y_u)$ [2f]



hep00-7a

$\Delta Y/\Delta Y_u$ TUBsRGB tristimulus value difference ΔY normalized to ΔY_u

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/\ln(10),\ d{=}0)$ [1a]

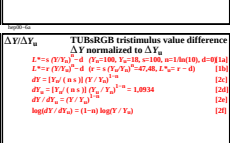
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 47,48,\ L^*_o = r - d)$ [1b]

$dY = [Y_u/(a\cdot s)]\ (Y/Y_u)^{1-a}$ [2c]

$dY_u = [Y_u/(a\cdot s)]\ (Y_u/Y_u)^{1-a} = 1,0934$ [2d]

$dY/dY_u = (Y/Y_u)^{1-a}$ [2e]

$\log(dY/dY_u) = (1-a)\log(Y/Y_u)$ [2f]



hep00-8a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}116,\ a{=}1/2.4,\ d{=}0)$ [1a]

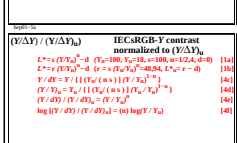
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 48,94,\ L^*_o = r - d)$ [1b]

$Y/dY = Y/[(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]$ [4c]

$(Y/Y)_u = Y_u/((Y_u/(a\cdot s))\ (Y_u/Y_u)^{1-a})$ [4d]

$(Y/dY)/(Y/dY)_u = (Y/Y_u)^a$ [4e]

$\log[(Y/dY)/(Y/dY)_u] = (a)\log(Y/Y_u)$ [4f]



hep01-7a

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

$L^* = s\ (Y/Y_u)^{0,43} - d \quad (Y_n{=}100,\ Y_o{=}18,\ s{=}100,\ a{=}1/\ln(10),\ d{=}0)$ [1a]

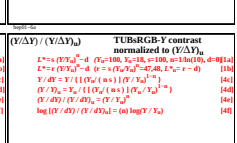
$L^* = r\ (Y/Y_u)^{0,43} - d \quad (r = s\ (Y_o/Y_n)^{0,43} = 47,48,\ L^*_o = r - d)$ [1b]

$Y/dY = Y/[(Y_u/(a\cdot s))\ (Y/Y_u)^{1-a}]$ [4c]

$(Y/Y)_u = Y_u/((Y_u/(a\cdot s))\ (Y_u/Y_u)^{1-a})$ [4d]

$(Y/dY)/(Y/dY)_u = (Y/Y_u)^a$ [4e]

$\log[(Y/dY)/(Y/dY)_u] = (a)\log(Y/Y_u)$ [4f]



hep01-8a

TUB-test chart hep0; LABJND, CIELAB, IECsRGB, and TUBsRGB colour-difference formulae
log & lin[lightness L^*, threshold ΔY, sensitivity $\Delta Y / Y$, contrast $Y / \Delta Y$, normalized for grey U]