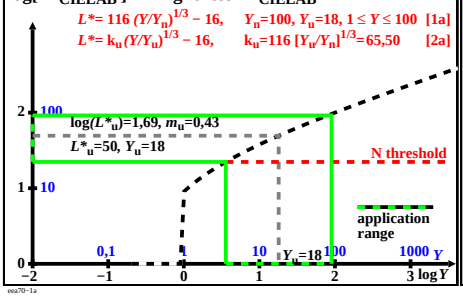
log[L^*_{CIELAB}] lightness L^*_{CIELAB}

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1a]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2a]



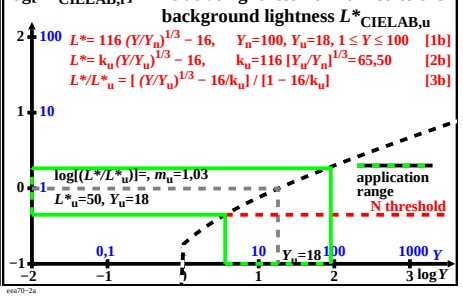
eea70−1a

log[$L^*_{CIELAB,r}$] relative lightness normalized to the background lightness $L^*_{CIELAB,u}$

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1b]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2b]

$L^*/L^*_u = [\,(Y/Y_u)^{1/3} - 16/k_u\,] / [\,1 - 16/k_u\,]$ [3b]



eea70−2a

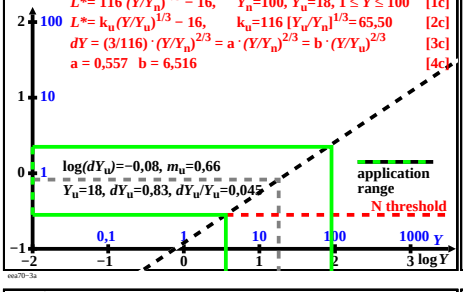
log[ΔY] ΔY_{CIELAB} tristimulus-value difference

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1c]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2c]

$dY = (3/116)\cdot(Y/Y_n)^{2/3} = a\cdot(Y/Y_n)^{2/3} = b\cdot(Y/Y_u)^{2/3}$ [3c]

a = 0,557 b = 6,516 [4c]



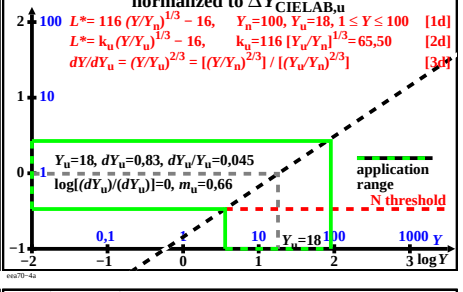
eea70−3a

log[$\Delta Y/\Delta Y_u$] ΔY_{CIELAB} tristimulus-value difference normalized to $\Delta Y_{CIELAB,u}$

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1d]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2d]

$dY/dY_u = (Y/Y_u)^{2/3} = [(Y/Y_n)^{2/3}] / [(Y_u/Y_n)^{2/3}]$ [3d]



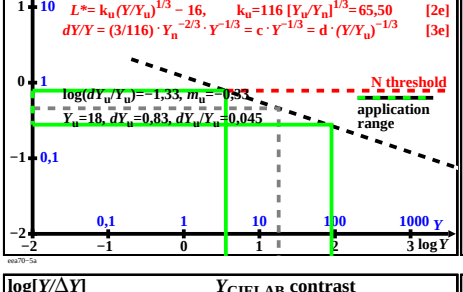
eea70−4a

log[$Y/\Delta Y$] Y_{CIELAB} sensitivity

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1e]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2e]

$dY/Y = (3/116)\cdot Y_n^{-2/3}\cdot Y^{-1/3} = c\cdot Y^{-1/3} = d\cdot(Y/Y_u)^{-1/3}$ [3e]



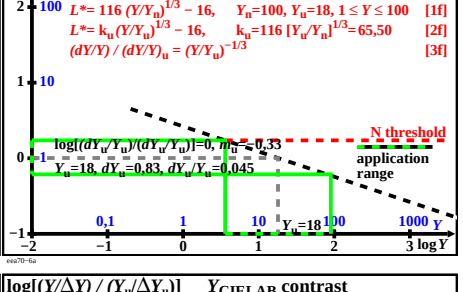
eea70−5a

log[($\Delta Y/Y$) / ($\Delta Y_u/Y_u$)] Y_{CIELAB} sensitivity normalized to $[\Delta Y/Y]_{CIELAB,u}$

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1f]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2f]

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



eea70−6a

log[$Y/\Delta Y$] Y_{CIELAB} contrast

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1g]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2g]

$Y/dY = (3/116)\cdot Y_n^{1/3} Y^{1/3}$ [3g]

$Y/dY = e\cdot(Y/Y_n)^{1/3} = f\cdot(Y/Y_u)^{1/3}$ [4g]

eea70−7a

log[($Y/\Delta Y$) / ($Y_u/\Delta Y_u$)] Y_{CIELAB} contrast normalized to $[Y/\Delta Y]_{CIELAB,u}$

$L^* = 116\,(Y/Y_n)^{1/3} - 16$, $Y_n=100$, $Y_u=18$, $1 \le Y \le 100$ [1h]

$L^* = k_u\,(Y/Y_u)^{1/3} - 16$, $k_u=116\,[Y_u/Y_n]^{1/3}=65{,}50$ [2h]

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

eea70−8a