

Equations: colorimetric data transfer from rgb_d to nce^*_d data and LCH^*_d data

Given: rgb_d device colour data of any colour $rgb_d = lab^*rgb_d$ and of 48 step colour circle $j=0$ to 47

$rgb_{Md,j}$ and CIELAB data $L^*_{Md,j}$, $C^*_{ab,Md,j}$, $h_{ab,Md,j} = LCH^*_{Md,j}$

Aim: calculate nce^*_d with ($0 \leq n^*_d, c^*_d, e^*_d \leq 1$) (similar to NCS data) and $LCH^*_{a,d}$ data of the device colour

Data of a given device (d) colour

relative chroma of the device colour $c^*_d = \max [rgb_d] - \min [rgb_d]$ (1)

relative blackness of the device colour $n^*_d = 1 - \max [rgb_d]$ (2)

relative triangle lightness of the device colour $t^*_d = 1 - n^*_d - 0,5 c^*_d$ (3)

relative red-green chroma in 6x60 degree system s $a^*_{rs,d} = r_d \cos(30) + g_d \cos(150)$ (4)

relative yellow-blue chroma in 6x60 degree system s $b^*_{rs,d} = r_d \sin(30) + g_d \sin(150) + b_d \sin(270)$ (5)

hue angle in 6x60 degree system s $h_{ab,s,d} = \arctan[b^*_{rs,d} / a^*_{rs,d}]$ ($0 \leq h_{ab,s,d} \leq 360$) (6)

hue number in 6x60 degree system s $e^*_d = h_{ab,s,d} / 360$ ($0 \leq e^*_d \leq 1$) (7)

CIELAB hue angle in device system $h_{ab,d} = \text{function} [h_{ab,s,d}]$ (with table/equations) (8)

adapted CIELAB LCH^*_d data of maximum colour M_d $L^*_{Md} = \text{function} [h_{ab,d}]$ (with table/equations) (9)

$C^*_{ab,Md} = \text{function} [h_{ab,d}]$ (with table/equations) (10)

$h_{ab,Md} = h_{ab,d}$ (11)

relative lightness of maximum colour M_d $l^*_{Md} = [L^*_{Md} - L^*_{Nd}] / [L^*_{Wd} - L^*_{Nd}]$ (12)

relative lightness of the device colour $l^*_d = t^*_d + l^*_{Md} c^*_d + 0,5 c^*_d$ (13)

CIELAB LCH^*_d data of the device colour $L^*_d = l^*_d [L^*_{Wd} - L^*_{Nd}] + L^*_{Nd}$ (14)

$C^*_{ab,d} = c^*_d C^*_{ab,Md}$ (15)