

Equations: colorimetric data transfer from rgb_d to nce^*_d data and $LCH^*_{a,d}$ 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 adapted CIELAB data $L^*_{Md,j}$, $C^*_{ab,a,Md,j}$, $h_{ab,a,Md,j} = LCH^*_{a,Md,j}$

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

$$c^*_d = \max [rgb_d] - \min [rgb_d] \quad (1)$$

relative blackness of the device colour

$$n^*_d = 1 - \max [rgb_d] \quad (2)$$

relative triangle lightness of the device colour

$$t^*_d = 1 - n^*_d - 0,5 c^*_d \quad (3)$$

relative red-green chroma in 6x60 degree system s

$$a^*_{rs,d} = r_d \cos(30) + g_d \cos(150) \quad (4)$$

relative yellow-blue chroma in 6x60 degree system s

$$b^*_{rs,d} = r_d \sin(30) + g_d \sin(150) + b_d \sin(270) \quad (5)$$

hue angle in 6x60 degree system s

$$h_{ab,s,d} = \arctan[b^*_{rs,d} / a^*_{rs,d}] \quad (0 \leq h_{ab,s,d} \leq 360) \quad (6)$$

hue number in 6x60 degree system s

$$e^*_d = h_{ab,s,d} / 360 \quad (0 \leq e^*_d \leq 1) \quad (7)$$

CIELAB hue angle in device system

$$h_{ab,a,d} = \text{function} [h_{ab,s,d}] \quad (\text{with table/equations}) \quad (8)$$

adapted CIELAB $LCH^*_{a,d}$ data of maximum colour M_d

$$L^*_{Md} = \text{function} [h_{ab,a,d}] \quad (\text{with table/equations}) \quad (9)$$

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

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

relative lightness of maximum colour M_d

$$l^*_{Md} = [L^*_{Md} - L^*_{Nd}] / [L^*_{Wd} - L^*_{Nd}] \quad (12)$$

relative lightness of the device colour

$$l^*_d = t^*_d + l^*_{Md} c^*_d + 0,5 c^*_d \quad (13)$$

adapted CIELAB $LCH^*_{a,d}$ data of the device colour

$$L^*_d = l^*_d [L^*_{Wd} - L^*_{Nd}] + L^*_{Nd} \quad (14)$$

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