

Equations: colorimetric data transfer from rgb^*_3 to nce^* data and LCH^* data

Given: Elementary colour data of any colour $rgb^*_3 = lab^*rgb^*_3$

CIELAB data L^*_X , $C^*_{ab,X}$, $h_{ab,X}$, a^*_X , b^*_X of eight basic colours $X = RJGC'BM'NW$

Aim: $nce^* = lab^*nce^*$ (similar to NCS data) and LCH^* data of the given colour ($0 \leq e^* \leq 1$)

$$\text{relative chroma of the given colour} \quad c^* = \max [rgb^*_3] - \min [rgb^*_3] \quad (1)$$

$$\text{relative blackness of the given colour} \quad n^* = 1 - \max [rgb^*_3] \quad (2)$$

$$\text{relative triangle lightness of the given colour} \quad t^* = 1 - n^* - 0,5 c^* \quad (3)$$

$$\text{relative red-green chroma in 60 degree system s} \quad a^*_{rs} = r^*_3 \cos(30) + g^*_3 \cos(150) \quad (4)$$

$$\text{relative yellow-blue chroma in 60 degree system s} \quad b^*_{rs} = r^*_3 \sin(30) + g^*_3 \sin(150) + b^*_3 \sin(270) \quad (5)$$

$$\text{hue angle in 60 degree system s} \quad h_{ab,s} = \arctan [b^*_{rs} / a^*_{rs}] \quad (0 \leq h_{ab,s} \leq 360) \quad (6)$$

$$\text{CIELAB hue angle in 60 degree system s} \quad h_{ab} = h_{ab,s} \quad (7)$$

$$\text{elementary hue number of the given colour} \quad e^* = \text{function} [h_{ab}] \quad (\text{with table or equation}) \quad (8)$$

$$\text{CIELAB } LCH^*_M \text{ data of maximum colour } M \quad L^*_M = \text{function} [h_{ab}] \quad (\text{with table or equation}) \quad (9)$$

$$C^*_{ab,M} = \text{function} [h_{ab}] \quad (\text{with table or equation}) \quad (10)$$

$$h_{ab,M} = h_{ab} \quad (11)$$

$$\text{relative lightness of maximum colour } M \quad l^*_M = [L^*_M - L^*_N] / [L^*_W - L^*_N] \quad (12)$$

$$\text{relative lightness of the given colour} \quad l^* = t^* + l^*_M c^* + 0,5 c^* \quad (13)$$

$$\text{CIELAB } LCH^* \text{ data of the given colour} \quad L^* = l^* [L^*_W - L^*_N] + L^*_N \quad (14)$$

$$C^*_{ab} = c^* C^*_{ab,M} \quad (15)$$

$$h_{ab} = h_{ab,M} \quad (16)$$