

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

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

Aim: calculate nce^*_d with $(0 < n^*_d, c^*_d, e^*_d < 1)$ (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

$$r^*_d = 1 - n^*_d - 0.5 c^*_d \quad (3)$$

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

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

hue number in 6x60 degree system s

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

CIELAB hue angle in device system

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

adapted CIELAB LCH^*_d data of maximum colour M_d

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

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

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

relative lightness of maximum colour M_d

$$l^*_{M,d} = [L^*_{M,d} - L^*_{N,d}] / [L^*_{W,d} - L^*_{N,d}] \quad (12)$$

relative lightness of the device colour

$$l^*_d = l^*_{M,d} + l^*_{M,d} c^*_d + 0.5 c^*_d \quad (13)$$

CIELAB LCH^*_d data of the device colour

$$L^*_d = l^*_d [L^*_{W,d} - L^*_{N,d}] + L^*_{N,d} \quad (14)$$

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

SF870-3N

Equations: colorimetric data transfer from rgb_e to nce^*_e data and LCH^*_e data

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

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

Aim: calculate nce^*_e with $(0 < n^*_e, c^*_e, e^*_e < 1)$ (similar to NCS data) and LCH^*_e data of elementary colour
Data of a given elementary (e) colour

relative chroma of the elementary colour

$$c^*_e = \max [rgb_e] - \min [rgb_e] \quad (1)$$

relative blackness of the elementary colour

$$n^*_e = 1 - \max [rgb_e] \quad (2)$$

relative triangle lightness of the elementary colour

$$r^*_e = 1 - n^*_e - 0.5 c^*_e \quad (3)$$

relative red-green chroma in 4x90 degree system s

$$a^*_{rs,e} = r_e \cos(0) + g_e \cos(180) \quad (4)$$

relative yellow-blue chroma in 4x90 degree system s

$$b^*_{rs,e} = r_e \sin(0) + g_e \sin(180) + b_e \sin(270) \quad (5)$$

hue angle in 4x90 degree system s

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hue number in 4x90 degree system s

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

CIELAB hue angle in elementary system

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

CIELAB LCH^*_e data of maximum colour M_e

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CIELAB LCH^*_e data of the elementary colour

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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

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hue number in 6x60 degree system s

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CIELAB hue angle in device system

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

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

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

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$$L^*_d = l^*_d [L^*_{W,d} - L^*_{N,d}] + L^*_{N,d} \quad (14)$$

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

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Equations: colorimetric data transfer from rgb_e to nce^*_e data and $LCH^*_{a,e}$ data

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

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

Aim: calculate nce^*_e with $(0 < n^*_e, c^*_e, e^*_e < 1)$ (similar to NCS data) and $LCH^*_{a,e}$ data of elementary colour
Data of a given elementary (e) colour

relative chroma of the elementary colour

$$c^*_e = \max [rgb_e] - \min [rgb_e] \quad (1)$$

relative blackness of the elementary colour

$$n^*_e = 1 - \max [rgb_e] \quad (2)$$

relative triangle lightness of the elementary colour

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relative red-green chroma in 4x90 degree system s

$$a^*_{rs,e} = r_e \cos(0) + g_e \cos(180) \quad (4)$$

relative yellow-blue chroma in 4x90 degree system s

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hue angle in 4x90 degree system s

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

hue number in 4x90 degree system s

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

CIELAB hue angle in elementary system

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

adapted CIELAB $LCH^*_{a,e}$ data of maximum colour M_e

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

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

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

relative lightness of maximum colour M_e

$$l^*_{M,e} = [L^*_{M,e} - L^*_{N,e}] / [L^*_{W,e} - L^*_{N,e}] \quad (12)$$

relative lightness of the elementary colour

$$l^*_e = l^*_{M,e} + l^*_{M,e} c^*_e + 0.5 c^*_e \quad (13)$$

adapted CIELAB $LCH^*_{a,e}$ data of the elementary colour

$$L^*_e = l^*_e [L^*_{W,e} - L^*_{N,e}] + L^*_{N,e} \quad (14)$$

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

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