

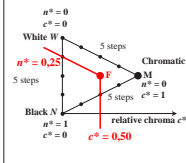
User friendly colorimetric colour notation ncu^* or ncc^* and linear relation to three rgb^*_3 data

n^* relative blackness

c^* relative chroma

u^* elementary (unique) hue text

e^* elementary hue number

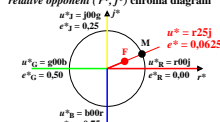


example for colour notation:

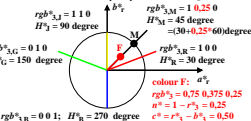
$ncu^* = 0.25 \ 0.50 \ r25j$

or $ncc^* = 0.25 \ 0.50 \ 0.0625 (=0.25/4)$

relative opponent (r^* , j^*) chroma diagram



relative CIELAB (a^* , b^* , L^*) chroma diagram



ZE210-3

Equations: colorimetric data transfer from ncc^* to elementary colour data rgb^*_3 and LCH^*

Given: ncc^* data (similar NCS) of any colour $ncc^* = lab^*ncc^*$ (in example M located between R and J)

CIELAB data L^*_M , $C^*_{ab,M}$, $h_{ab,M}$, a^*_M , b^*_M of eight basic colours $X = R/G/C/B^*/M/W$

Aim: Elementary colour data rgb^*_3 and LCH^* (CIELAB) of the given colour

relative whiteness of the given colour $w^* = 1 - n^* - c^*$ (1)

relative triangle lightness of the given colour $t^* = 1 - n^* - 0.5 c^*$ (2)

CIELAB hue angle of maximum colour M $h_{ab,M} = \text{function} [C^*_{ab,M}]$ (with table or equation) (3)

Relative device hue angle ratio of M $\alpha_M = [h_{ab,M} - h_{ab,R}] / [h_{ab,J} - h_{ab,R}]$ (4)

relative rgb^*_3 data of M $r^*_{3,M} = \alpha_M r^*_{3,J} + (1 - \alpha_M) r^*_{3,R}$ (5)

$g^*_{3,M} = \alpha_M g^*_{3,J} + (1 - \alpha_M) g^*_{3,R}$ (6)

$b^*_{3,M} = \alpha_M b^*_{3,J} + (1 - \alpha_M) b^*_{3,R}$ (7)

relative rgb^*_3 data of the given colour $r^*_3 = w^* + c^* r^*_{3,M}$ (8)

$g^*_3 = w^* + c^* g^*_{3,M}$ (9)

$b^*_3 = w^* + c^* b^*_{3,M}$ (10)

CIELAB data L^*_M , a^*_M , b^*_M , $C^*_{ab,M}$ of M $L^*_M = \alpha_M L^*_J + (1 - \alpha_M) L^*_R$ (11)

$a^*_M = \alpha_M a^*_J + (1 - \alpha_M) a^*_R$ (12)

$b^*_M = \alpha_M b^*_J + (1 - \alpha_M) b^*_R$ (13)

$C^*_{ab,M} = [a^{*2}_M + b^{*2}_M]^{1/2}$ (14)

relative lightness L^* of the given colour $L^* = t^* + c^* [L^*_M - L^*_N] / [L^*_W - L^*_N] - 0.5 c^*$ (15)

CIELAB data LCH^* of the given colour $L^* = L^*_N + L^* [L^*_W - L^*_N]$ (16)

$C^*_{ab} = c^* C^*_{ab,M}$ (17)

$h_{ab} = h_{ab,M}$ (18)

ZE211-3

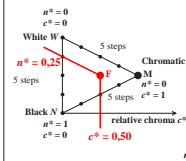
User friendly colorimetric colour notation ncu^* or ncc^* and linear relation to three rgb^*_3 data

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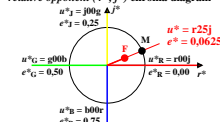


example for colour notation:

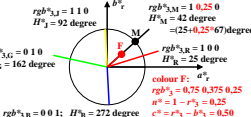
$ncu^* = 0.25 \ 0.50 \ r25j$

or $ncc^* = 0.25 \ 0.50 \ 0.0625 (=0.25/4)$

relative opponent (r^* , j^*) chroma diagram



relative CIELAB (a^* , b^* , L^*) chroma diagram



ZE210-7

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

Given: Elementary colour data of any colour $rgb^*_3 = lab^*rgb^*_3$ (in example M located between R and J)

CIELAB data L^*_X , $C^*_{ab,X}$, $h_{ab,X}$, a^*_X , b^*_X of eight basic colours $X = R/G/C/B^*/M/W$

Aim: $ncc^* = lab^*ncc^*$ (similar NCS) and LCH^* (CIELAB) data of the given colour ($0 < c^* < 1$)

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

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

relative triangle lightness of the given colour $t^* = 1 - n^* - 0.5 c^*$ (3)

relative red-green chroma in standard system $a^*_{TS} = r^*_3 \cos(30) + g^*_3 \cos(150)$ (4)

relative yellow-blue chroma in standard system $b^*_{TS} = r^*_3 \sin(30) + g^*_3 \sin(150) + b^*_3 \sin(270)$ (5)

hue angle in standard system $h_{ab,X} = \arctan [b^*_{TS} / a^*_{TS}]$ ($0 < h_{ab,X} < 360$) (6)

CIELAB hue angle of maximum colour M $h_{ab,M} = \text{function} [h_{ab,X}]$ (with table or equation) (7)

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

Relative device hue angle ratio of M $\alpha_M = [h_{ab,M} - h_{ab,R}] / [h_{ab,J} - h_{ab,R}]$ (9)

CIELAB data L^*_M , a^*_M , b^*_M , $C^*_{ab,M}$ of M $L^*_M = \alpha_M L^*_J + (1 - \alpha_M) L^*_R$ (10)

$a^*_M = \alpha_M a^*_J + (1 - \alpha_M) a^*_R$ (11)

$b^*_M = \alpha_M b^*_J + (1 - \alpha_M) b^*_R$ (12)

$C^*_{ab,M} = [a^{*2}_M + b^{*2}_M]^{1/2}$ (13)

relative lightness L^* of the given colour $L^* = t^* + c^* [L^*_M - L^*_N] / [L^*_W - L^*_N] - 0.5 c^*$ (14)

CIELAB data LCH^* of the given colour $L^* = L^*_N + L^* [L^*_W - L^*_N]$ (15)

$C^*_{ab} = c^* C^*_{ab,M}$ (16)

$h_{ab} = h_{ab,M}$ (17)

ZE211-7

BAM-test chart ZE21; colorimetric coordinate transfer
User coordinates and transfer olv^*_3 , LCH^* and ncc^*

input: rgb ($\rightarrow olv^*_3$) $setrgbcolor$
output: no change compared to input