

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	$c^*_d = \max [rgb_d] - \min [rgb_d]$	(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	$h_{ab,a,d} = \text{function} [h_{ab,s,d}]$ (with table/equations)	(8)
-----------------------------------	--	-----

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

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

	$h_{ab,a,Md} = h_{ab,a,d}$	(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)
---	--	------

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

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