

colour valence metric (color data: linear relation to CIE 1931 data)		
linear color terms	name and relationship to CIE tristimulus or chromaticity values	notes
tristimulus values	X, Y, Z	
chromatic value	<i>linear chromatic value diagram (A, B)</i>	$n=D65$
red-green	$A = [X/Y - X_n/Y_n] Y = [a - a_n] Y$ $= [x/y - x_n/y_n] Y$	(background)
yellow-blue	$B = -0,4 [Z/Y - Z_n/Y_n] Y = [b - b_n] Y$ $= -0,4 [z/y - z_n/y_n] Y$	
radial	$C_{AB} = [A^2 + B^2]^{1/2}$	
chromaticity	<i>linear chromaticity diagram (a, b)</i>	<i>compare to linear cone excitation</i>
red-green	$a = X/Y = x/y$	$L/(L+M)=P/(P+D)$ $S/(L+M)=T/(P+D)$
yellow-blue	$b = -0,4 [Z/Y] = -0,4 [z/y]$	
radial	$c_{ab} = [(a - a_n)^2 + (b - b_n)^2]^{1/2}$	

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higher colour metric (color data: nonlinear relation to CIE 1931 data)		
nonlinear color terms	name and relationship with tristimulus or chromaticity values	notes
lightness	$L^* = 116 (Y/100)^{1/3} - 16 \quad (Y > 0,8)$ approximation: $L^* = 100 (Y/100)^{1/2,4} \quad (Y > 0)$	CIELAB 1976
chroma	<i>nonlinear transform chromatic values A, B</i>	CIELAB 1976 $n=D65$ (background)
red-green	$a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}]$ $= 500 (a' - a'_n) Y^{1/3}$	
yellow-blue	$b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}]$ $= 500 (b' - b'_n) Y^{1/3}$	
radial	$C_{ab}^* = [a^{*2} + b^{*2}]^{1/2}$	compare to log cone excitation $\log[L/(L+M)]$ $= \log[P/(P+D)]$ $\log[S/(L+M)]$ $= \log[T/(P+D)]$
chromaticity	<i>nonlinear transform chromaticities x/y, z/y</i>	
red-green	$a' = (1/X_n)^{1/3} (x/y)^{1/3}$ $= 0,2191 (x/y)^{1/3} \quad \text{for D65}$	
yellow-blue	$b' = -0,4 (1/Z_n)^{1/3} (z/y)^{1/3}$ $= -0,08376 (z/y)^{1/3} \quad \text{for D65}$	
radial	$c_{ab}' = [(a' - a'_n)^2 + (b' - b'_n)^2]^{1/2}$	

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