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	*linear chromatic value diagram (A, B)*	*n=D65*
red−green	$A = [\ X / Y - X_n / Y_n\ ]\ Y = [\ a - a_n\ ]\ Y$	*(background)*
	$= [\ x / y - x_n / y_n\ ]\ Y$	
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	*linear chromaticity diagram (a, b)*	***compare to linear cone excitation***
red−green	$a = X / Y = x / y$	
yellow−blue	$b = -\ 0{,}4\ [Z / Y\ ] = -\ 0{,}4\ [z / y\ ]$	
radial	$c_{ab} = [\ (\ a - a_n\ )^2 + (\ b - b_n\ )^2\ ]^{1/2}$	$L/(L+M) = P/(P+D)$ $S/(L+M) = T/(P+D)$

1−000030−L0 CET3/−7N

higher colour metric (color data: nonlinear relation to CIE 1931 data)

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

1−000030−L0 CET31−7N