



Higher colorimetric (color data: nonlinear relation to CIE 1931 data)		
non linear color terms	name and relationship with tristimulus or chromaticity values	notes
lightness	$L^* = 116 (Y/Y_n)^{1/3} - 16 (Y > 0.8)$ Approximation: $L^* = 100 (Y/Y_n)^{1/2.4}$	CIELAB 1976
chroma	non linear transform of chromatic values A and B	
red-green	$a^* = 500 [(X/X_n)^{1/3} - (Y/Y_n)^{1/3}]$ $= 500 (a' - a_n') Y^{1/3}$	CIELAB 1976 $n=D65$ (backgr.)
yellow-blue	$b^* = 200 [(Y/Y_n)^{1/3} - (Z/Z_n)^{1/3}]$ $= 500 (b' - b_n') Y^{1/3}$	CIELAB 1976
radial	$C^*_{ab} = [(a^*)^2 + (b^*)^2]^{1/2}$	
chromaticity	nonlinear transform of chromaticities $a=x/y$ and $b=z/y$	
red-green	$a' = (1/X_n)^{1/3} (x/y)^{1/3}$ $= 0.2191 (x/y)^{1/3}$ for D65	compare to log cone excitation
yellow-blue	$b' = -0.4 (1/Z_n)^{1/3} (z/y)^{1/3}$ $= -0.08376 (z/y)^{1/3}$ for D65	$\log[P/(P+D)]$ $\log[T/(P+D)]$
radial	$c'_{ab} = [(a' - a_n')^2 + (b' - b_n')^2]^{1/2}$	

color valence metric (color data: linear relation to CIE 1931 data)		
linear color terms	name and relationship to CIE tristimulus or chromaticity values	notes:
luminous value	$Y = y (X + Y + Z)$	
chromatic value	for linear chromatic value diagram (A, B)	
red-green	$A = [X/Y - X_n/Y_n] Y = [a - a_n] Y$ $= [x/y - x_n/y_n] Y$	$n=D65$ (backgr.)
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	for (linear) chromaticity diagram (a, b)	compare to linear cone excitation
red-green	$a = X/Y = x/y$	$P/(P+D)$
yellow-blue	$b = -0.4 [Z/Y] = -0.4 [z/y]$	$T/(P+D)$
radial	$c_{ab} = [(a - a_n)^2 + (b - b_n)^2]^{1/2}$	