

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

nonlinear color terms	name and relationship with tristimulues 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>	
red–green	$a^* = 500 [ ( X / X_n )^{1/3} - ( Y / Y_n )^{1/3} ]$ $= 500 ( a' - a'_n ) Y^{1/3}$	CIELAB 1976
yellow–blue	$b^* = 200 [ ( Y / Y_n )^{1/3} - ( Z / Z_n )^{1/3} ]$ $= 500 ( b' - b'_n ) Y^{1/3}$	CIELAB 1976 <i>n=D65</i>
radial	$C^*_{ab} = [ a^{*2} + b^{*2} ]^{1/2}$	<i>(background)</i>
chromaticity	<i>nonlinear transform chromaticities x/y, z/y</i>	<i>compare to log cone excitation</i>
red–green	$a' = ( 1 / X_n )^{1/3} ( x / y )^{1/3}$ $= 0,2191 ( x / y )^{1/3} \quad \text{for D65}$	$\log[L / (L+M)]$
yellow–blue	$b' = - 0,4 ( 1 / Z_n )^{1/3} ( z / y )^{1/3}$ $= - 0,08376 ( z / y )^{1/3} \quad \text{for D65}$	$= \log[P / (P+D)]$ $\log[S / (L+M)]$
radial	$c'_{ab} = [ ( a' - a'_n )^2 + ( b' - b'_n )^2 ]^{1/2}$	$= \log[T / (P+D)]$