

Colour space CIELAB 1976 (color data: nonlinear relation to CIE 1931)

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 of 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
radial	$C^*_{ab} = [a^{*2} + b^{*2}]^{1/2}$	<i>n=D65</i> (background)
chromaticity	<i>nonlinear transform of chromaticities x/y, z/y</i>	<i>compare to log cone excitation</i>
red-green	$a' = (1 / X_n)^{1/3} (x / y)^{1/3}$ $= 0,2191 (x / y)^{1/3} \quad \text{for D65}$	$\log[\text{L} / (\text{L}+\text{M})]$
yellow-blue	$b' = -0,4 (1 / Z_n)^{1/3} (z / y)^{1/3}$ $= -0,08376 (z / y)^{1/3} \quad \text{for D65}$	$= \log[\text{P} / (\text{P}+\text{D})]$
radial	$c'_{ab} = [(a' - a'_n)^2 + (b' - b'_n)^2]^{1/2}$	$\log[\text{S} / (\text{L}+\text{M})]$ $= \log[\text{T} / (\text{P}+\text{D})]$