

## percieved color terms (colorness: cube root coordinates)

| percieved color terms | name and relationship with standard chromaticity values                                                                                       | notes:                                |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| <b>lightness</b>      | $L^* = 116 ( Y / 100 )^{1/3} - 16$<br><i>Näherung:</i> $L^* = 100 ( Y / 100 )^{1/3}$                                                          | definition 1976 in:<br>CIELUV, CIELAB |
| <b>chromaticness</b>  | <i>for linear chromatic value diagram (AT, B)</i>                                                                                             |                                       |
| red-green             | $a^* = 500 [ ( X / X_n )^{1/3} - ( Y / Y_n )^{1/3} ]$<br>$= 500 ( a' - a'_n ) Y^{1/3}$                                                        | definition 1976 in:<br>CIELAB         |
| yellow-blue           | $b^* = 200 [ ( Y / Y_n )^{1/3} - ( Z / Z_n )^{1/3} ]$<br>$= 500 ( b' - b'_n ) Y^{1/3}$                                                        | $n=D65$ (surround)                    |
| radial                | $C^* = [ a^{*2} + b^{*2} ]^{1/2}$                                                                                                             |                                       |
| <b>saturation</b>     | <b>= chromaticness / lightness</b>                                                                                                            | definition                            |
| red-green             | $S_a^* = a^* / [ 100 ( Y / 100 )^{1/3} ]$<br>$= 21,6 ( a' - a'_n )$                                                                           | for:<br>CIELAB 1976                   |
| yellow-blue           | $S_b^* = b^* / [ 100 ( Y / 100 )^{1/3} ]$<br>$= 21,6 ( b' - b'_n )$                                                                           |                                       |
| radial                | $S_c^* = C^* / [ 100 ( Y / 100 )^{1/3} ]$<br>$= 21,6 [ ( a' - a'_n )^2 + ( b' - b'_n )^2 ]^{1/2}$                                             |                                       |
| <b>chromaticity</b>   | <i>for nonlinear chromaticity diagram (a', b')</i> definition                                                                                 |                                       |
| red-green             | $a' = ( 1 / X_n )^{1/3} ( x / y )^{1/3}$                                                                                                      | opponent                              |
| yellow-blue           | $= 0,2191 ( x / y )^{1/3}$ for D65                                                                                                            | color system                          |
| radial                | $b' = - 0,4 ( 1 / Z_n )^{1/3} ( z / y )^{1/3}$<br>$= - 0,08376 ( z / y )^{1/3}$ for D65<br>$c' = [ ( a' - a'_n )^2 + ( b' - b'_n )^2 ]^{1/2}$ |                                       |