Lightness L^*_{JND} for the Just Noticeable Difference (JND)

For adjacent surface colours in the range $0{,}0036<R<0{,}90$

or the digital range $1/255=0{,}0039<R<1{,}00$ it is valid:

$L^*_{JND} = a\,(R/R_n)^k$ **[1]** $\mathbf{a=572;\ R_n=1{,}00;\ k=0{,}14=1/7{,}2}$

$= b\,(R/R_u)^k$ **[2]** $\mathbf{b=a(R_u/R_n)^k=450;\ R_u=0{,}18}$

For $R=R_u$ it is valid: $\mathbf{L^*_{JNDu}=450.}$

Derivation of equation [2] gives with $\mathbf{1-k = 0{,}86:}$

$\delta(L^*_{JND})/\delta R = c\,(R/R_u)^{1-k}$ **[3]** $\mathbf{c = (b\,k)/R_u = 63/18 = 3{,}5}$

or for the treshold $\delta(L^*_{JND})=1$

$\delta R = d\,(R/R_u)^{1-k}$ **[4]** $\mathbf{d = R_u/(b\,k) = 18/63 = 0{,}29}$

For the surround lightness $L^*_{JNDu}=450$ with $R=R_u$ the threshold is $\delta R_{JNDu} = 0{,}29$. This threshold is *independent* of k.