Lightness L^*_W for surround white W

For adjacent surface colours in the range $3{,}6<L<90$

or the digital range $100/255=0{,}39<L<100$ it is valid:

$L^*_W = a\,(L/L_W)^k$ **[1]** **a=100; L_W=142cd/m^2; k=0,50**

$= b\,(L/L_u)^k$ **[2]** **$b=a(L_u/L_W)^k=42$; $L_u=18$**

For $L=L_u$ it is valid: $L^*=42$.

Derivation of equation [2] gives with $1-k = 0{,}50$:

$\delta(L^*_W)/\delta L = c\,(L/L_u)^{1-k}$ **[3]** $c = (b\,k)/L_u = 21/18 = 1{,}17$

or for the treshold $\delta(L^*_W)=1$

$\delta L = d\,(L/L_u)^{1-k}$ **[4]** $d = L_u/(b\,k) = 18/21 = 0{,}86$

For the surround lightness $L^*_{Wu} = 50$ with $L=L_u$ the threshold is:

$\delta L_u = 0{,}86$. This threshold is *independent* of k.