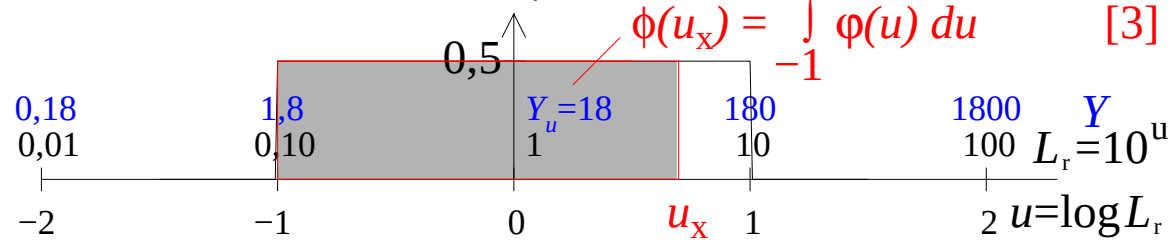
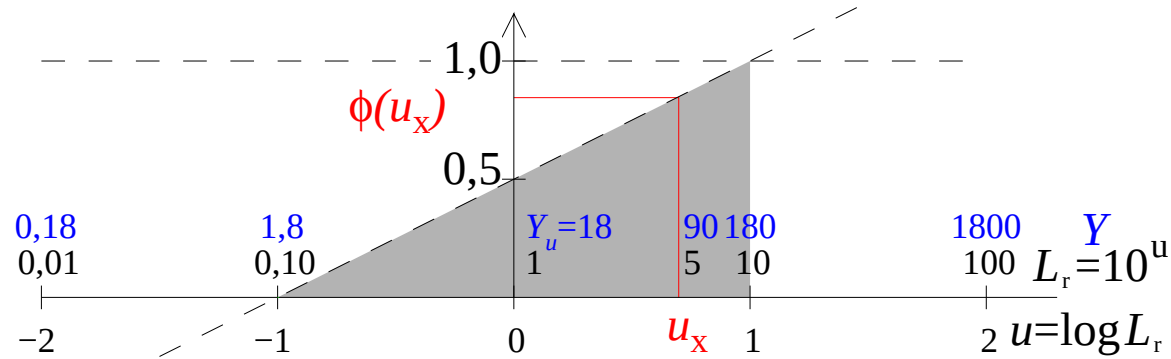
Density and distribution function for luminance and lightness

Density function $\varphi(u)$ compare with CIE luminance contrast $L/\Delta L$

$\varphi(u)=(1/2)\cdot 1$ $\qquad$ $\varphi(u)$ $\qquad$ [1]

$\phi(u_x) = \int_{-1}^{u_x} \varphi(u)\, du$ [3]



Distribution function $\phi(u)$ corresponds to the CIE lightness L^*

$\phi(u)=(1/2)\cdot(1+u)$ $\qquad$ $\phi(u)$ $\qquad$ [2]