Universal curve of G_{res} – Formulae

E. Martinho, I.F. Gonçalves, J. Salgado: *Universal curve of epithermal neutron resonance self-shielding factors in foils, wires and spheres*. Applied Radiation and Isotopes **58** (2003) 371-375

I.F. Gonçalves, E. Martinho, J. Salgado: *Extension to cylindrical samples of the universal curve of resonance neutron self-shielding factors*. Nuclear Instruments and Methods in Physics Research B **213** (2004) 186-188

$$G_{res}(z) = \frac{0.94}{1+\left(z/2.70\right)^{0.82}} + 0.06$$

with

$$z = \Sigma_{tot}\left(E_{res}\right)\cdot y \cdot \sqrt{\frac{\Gamma_{\gamma}}{\Gamma}}$$

where ***y*** is given by:

Geometry (*dimension*)	***y*** (cm)
Foils ($thickness = t$)	$y = 1.5\,t$
Wires ($radius = R$)	$y = 2\,R$
Spheres ($radius = R$)	$y = R$
Cylinders ($radius = R$; $height = h$) ($1 \le h/R \le 3$)	$y = 1.65\dfrac{Rh}{R+h}$

$\boldsymbol{\Sigma_{tot}}(E_{res})$ = total macroscopic cross-section at the resonance peak
$\boldsymbol{\Gamma_{\gamma}}$ = resonance width for the (n,γ) reaction
$\boldsymbol{\Gamma}$ = total resonance width ($\Gamma = \Gamma_{\gamma} + \Gamma_{n}$)
$\boldsymbol{\Gamma_{n}}$ = resonance width for the (n,n) reaction.