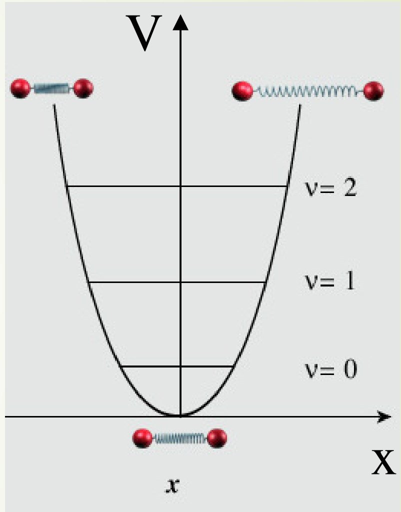
V
ν= 2
ν= 1
ν= 0
x
X

Avec $$H_v(x) = (-1)^v e^{x^2} \frac{d^v}{dx^v} e^{-x^2}$$

v	$H_v(y)$	E_v
0	1	$\frac{1}{2}\hbar\omega$
1	$2y$	$\frac{3}{2}\hbar\omega$
2	$4y^2-2$	$\frac{5}{2}\hbar\omega$
3	$8y^3-12y$	$\frac{7}{2}\hbar\omega$
4	$16y^4-48y^2+12$	$\frac{9}{2}\hbar\omega$
5	$32y^5-160y^3+120y$	$\frac{11}{2}\hbar\omega$

Premiers polynômes d'Hermite

Notez la succession de fonctions paires et impaires

First four harmonic oscillator normalized wavefunctions

$$\Psi_0 = \left(\frac{\alpha}{\pi}\right)^{1/4} e^{-y^2/2}$$

$$\Psi_1 = \left(\frac{\alpha}{\pi}\right)^{1/4} \sqrt{2}y\, e^{-y^2/2}$$

$$\Psi_2 = \left(\frac{\alpha}{\pi}\right)^{1/4} \frac{1}{\sqrt{2}}(2y^2 - 1)e^{-y^2/2}$$

$$\Psi_3 = \left(\frac{\alpha}{\pi}\right)^{1/4} \frac{1}{\sqrt{3}}(2y^3 - 3y)e^{-y^2/2}$$

$$\alpha = \frac{m\,\omega}{\hbar} \qquad y = \sqrt{\alpha}\,x$$