

Integrales de la forma

$$\int_0^{\infty} x^n e^{-\alpha x^2}$$

In [29]:

```
import sympy as sy
sy.init_printing(use_unicode=False, wrap_line=False, no_global=True)
```

In [30]:

```
x,y = sy.symbols("x,y")
alpha = sy.Symbol("alpha",positive=True)
```

In [31]:

```
sy.integrate(sy.exp(-alpha * x**2),(x,0,sy.oo))
```

Out[31]:

$$\frac{\sqrt{\pi}}{2\sqrt{\alpha}}$$

In [32]:

```
# No quiero escribir sy. todo el tiempo (!)
from sympy import integrate,exp,oo
```

In [33]:

```
integrate(exp(-alpha * x**2), (x,0,oo))
```

Out[33]:

$$\frac{\sqrt{\pi}}{2\sqrt{\alpha}}$$

n Par

In [35]:

```
print(integrate(exp(-alpha * x**2), (x,0,oo)) )
print(integrate(x**2 * exp(-alpha * x**2), (x,0,oo)) )
print(integrate(x**4 * exp(-alpha * x**2), (x,0,oo)) )
print(integrate(x**6 * exp(-alpha * x**2), (x,0,oo)) )
```

```
sqrt(pi)/(2*sqrt(alpha))
sqrt(pi)/(4*alpha**(3/2))
3*sqrt(pi)/(8*alpha**(5/2))
15*sqrt(pi)/(16*alpha**(7/2))
```

In [36]:

```
# Para que quede mas elegante el formato:

a0 = integrate(exp(-alpha * x**2), (x,0,oo))
a2 = integrate(x**2 * exp(-alpha * x**2), (x,0,oo))
a4 = integrate(x**4 * exp(-alpha * x**2), (x,0,oo))
a6 = integrate(x**6 * exp(-alpha * x**2), (x,0,oo))

print(sy.latex(a0))
print(sy.latex(a2))
print(sy.latex(a4))
print(sy.latex(a6))
```

```
\frac{\sqrt{\pi}}{2 \sqrt{\alpha}}
\frac{\sqrt{\pi}}{4 \alpha^{\frac{3}{2}}}
\frac{3 \sqrt{\pi}}{8 \alpha^{\frac{5}{2}}}
\frac{15 \sqrt{\pi}}{16 \alpha^{\frac{7}{2}}}
```

$$\int_0^{\infty} x^0 e^{-\alpha x^2} = \frac{1}{2} \sqrt{\frac{\pi}{\alpha}}$$

$$\int_0^{\infty} x^2 e^{-\alpha x^2} = \frac{1}{4} \sqrt{\frac{\pi}{\alpha^3}}$$

$$\int_0^{\infty} x^4 e^{-\alpha x^2} = \frac{3}{8} \sqrt{\frac{\pi}{\alpha^5}}$$

$$\int_0^{\infty} x^6 e^{-\alpha x^2} = \frac{15}{16} \sqrt{\frac{\pi}{\alpha^7}}$$

n Impar

In [25]:

```
a1 = integrate(x* exp(-alpha * x**2), (x,0,oo))
a3 = integrate(x**3 * exp(-alpha * x**2), (x,0,oo))
a5 = integrate(x**5 * exp(-alpha * x**2), (x,0,oo))
a7 = integrate(x**7 * exp(-alpha * x**2), (x,0,oo))

print(sy.latex(a1))
print(sy.latex(a3))
print(sy.latex(a5))
print(sy.latex(a7))
```

```
\frac{1}{2 \alpha}
\frac{1}{2 \alpha^2}
\frac{1}{\alpha^3}
\frac{3}{\alpha^4}
```

$$\int_0^{\infty} x e^{-\alpha x^2} = \frac{1}{2\alpha}$$

$$\int_0^{\infty} x^3 e^{-\alpha x^2} = \frac{1}{2\alpha^2}$$

$$\int_0^{\infty} x^5 e^{-\alpha x^2} = \frac{1}{\alpha^3}$$

$$\int_0^{\infty} x^7 e^{-\alpha x^2} = \frac{3}{\alpha^4}$$

In []:

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Integrales (resumen)

$$\int_0^{\infty} x^0 e^{-\alpha x^2} = \frac{1}{2} \sqrt{\frac{\pi}{\alpha}}$$

$$\int_0^{\infty} x^2 e^{-\alpha x^2} = \frac{1}{4} \sqrt{\frac{\pi}{\alpha^3}}$$

$$\int_0^{\infty} x^4 e^{-\alpha x^2} = \frac{3}{8} \sqrt{\frac{\pi}{\alpha^5}}$$

$$\int_0^{\infty} x^6 e^{-\alpha x^2} = \frac{15}{16} \sqrt{\frac{\pi}{\alpha^7}}$$

$$\int_0^{\infty} x e^{-\alpha x^2} = \frac{1}{2\alpha}$$

$$\int_0^{\infty} x^3 e^{-\alpha x^2} = \frac{1}{2\alpha^2}$$

$$\int_0^{\infty} x^5 e^{-\alpha x^2} = \frac{1}{\alpha^3}$$

$$\int_0^{\infty} x^7 e^{-\alpha x^2} = \frac{3}{\alpha^4}$$

In []: