量子力学常用积分公式

(1) $\int x^n e^{ax} dx = \frac{1}{a} x^n e^{ax} - \frac{n}{a} \int x^{n-1} e^{ax} dx \qquad (n > 0)$

(2) $\int e^{ax} \sin bx dx = \frac{e^{ax}}{a^2 + b^2} (a \sin bx - b \cos bx)$

(3) $\int e^{ax} \cos ax dx = \frac{e^{ax}}{a^2 + b^2} (a \cos bx + b \sin bx)$

(4) $\int x \sin ax dx = \frac{1}{a^2} \sin ax - \frac{1}{a} x \cos ax$

(5) $\int x^2 \sin ax dx = \frac{2x}{a^2} \sin ax + (\frac{2}{a^2} - \frac{x^2}{a}) \cos ax$

(6) $\int x \cos ax dx = \frac{1}{a^2} \cos ax + \frac{x}{a} \sin ax$

(7) $\int x^2 \cos ax dx = \frac{2x}{a^2} \cos ax + (\frac{x^2}{a} - \frac{2}{a^3}) \sin ax)$

(8) $\int_0^\infty e^{-ax} x^n dx = \frac{n!}{a^{n+1}} \qquad (n = 正整数, a > 0)$

(9) $\int_0^\infty e^{-ax^2} dx = \frac{1}{2} \sqrt{\frac{\pi}{a}}$

(10) $\int_0^\infty x^{2n} e^{-ax^2} dx = \frac{(2n-1)!!}{2^{n+1}} \sqrt{\frac{\pi}{a^{2n+1}}}$

(11) $\int_0^\infty x^{2n+1} e^{-ax^2} dx = \frac{n!}{2a^{n+1}}$

(12) $\int_0^\infty \frac{\sin^2 ax}{x^2} dx = \frac{\pi a}{2}$

(13) $\int_0^\infty x e^{-ax} \sin bx dx = \frac{2ab}{(a^2 + b^2)^2} \qquad (a > 0)$

(14) $\int_0^\infty x e^{-ax} \cos bx dx = \frac{a^2 - b^2}{(a^2 + b^2)^2} \qquad (a > 0)$