

Integrals

1. $\int e^{at} dt = \frac{1}{a} e^{at} + C$
2. $\int t^n e^{at} dt = \frac{1}{a} t^n e^{at} - \frac{n}{a} \int t^{n-1} e^{at} dt$
3. $\int t \sin(at) dt = \frac{1}{a^2} (\sin(at) - at \cos(at)) + C$
4. $\int t^2 \sin(at) dt = \frac{1}{a^3} ((2 - a^2 t^2) \cos(at) + at \sin(at)) + C$
5. $\int t \cos(at) dt = \frac{1}{a^2} (\cos(at) + at \sin(at)) + C$
6. $\int t^2 \cos(at) dt = \frac{1}{a^3} ((a^2 t^2 - 2) \sin(at) + 2at \cos(at)) + C$
7. $\int e^{at} \cos(bt) dt = \frac{e^{at}}{a^2 + b^2} (a \cos(bt) + b \sin(bt)) + C$
8. $\int e^{at} \sin(bt) dt = \frac{e^{at}}{a^2 + b^2} (a \sin(bt) - b \cos(bt)) + C$
9. $\int \cos(at) \cos(bt) dt = \begin{cases} \frac{\sin((a+b)t)}{2(a+b)} + \frac{\sin((a-b)t)}{2(a-b)} + C, & a \neq b \\ \frac{t}{2} + \frac{1}{4a} \sin(2at) + C, & a = b \end{cases}$
10. $\int \sin(at) \sin(bt) dt = \begin{cases} \frac{\sin((a+b)t)}{2(a+b)} - \frac{\sin((a-b)t)}{2(a-b)} + C, & a \neq b \\ \frac{t}{2} - \frac{1}{4a} \sin(2at) + C, & a = b \end{cases}$
11. $\int \sin(at) \cos(bt) dt = \begin{cases} -\frac{\cos((a+b)t)}{2(a+b)} - \frac{\cos((a-b)t)}{2(a-b)} + C, & a \neq b \\ -\frac{\cos(2at)}{4a} + C, & a = b \end{cases}$