טבלת טרנספורם לפלס

נוסחה מס'	$f(t)$	$\Phi(s)$
1	1	$\frac{1}{s} \quad , \quad s>0$
2	e^{at}	$\frac{1}{s-a} \quad , \quad s>a$
3	$t^n \quad , \quad n=1,2,3,.....$	$\frac{n!}{s^{n+1}} \quad , \quad s>0$
4	$\sin at$	$\frac{a}{s^2+a^2} \quad , \quad s>0$
5	$\cos at$	$\frac{s}{s^2+a^2} \quad , \quad s>0$
6	$e^{at}\sin bt$	$\frac{b}{(s-a)^2+b^2} \quad , \quad s>a$
7	$e^{at}\cos bt$	$\frac{s-a}{(s-a)^2+b^2} \quad , \quad s>a$
8	$t^n e^{at} \quad , \quad n=1,2,3,..$	$\frac{n!}{(s-a)^{n+1}} \quad , \quad s>a$
9	$u_c(t)$	$\frac{e^{-cs}}{s} \quad , \quad s>0$
10	$u_c(t)f(t-c)$	$e^{-cs}F(s)$
11	$e^{at}f(t)$	$F(s-a)$
12	$f(ct)$	$\frac{1}{c}F(\frac{s}{c}) \quad , \quad c>0$
13	$\delta(t-c)$	e^{-cs}
14	$f^{(n)}(t)$	$s^nF(s)-s^{n-1}f(0)-...-f^{(n-1)}(0)$
15	$\sinh at$	$\frac{a}{s^2-a^2} \quad , \quad s>\|a\|$
16	$\cosh at$	$\frac{s}{s^2-a^2} \quad , \quad s>\|a\|$
17	$f(t)=\begin{cases}0, t<t_1\\ g(t), t_1\le t\le t_2\\ 0, t>t_2\end{cases}$	$L\{g(t)\}=G(s), L\{g(t+\tau)\}=G_\tau(s)$ $L\{f(t)\}=e^{-st_1}G_{t_1}(s)-e^{-st_2}G_{t_2}(s)$

המכילים פונקציות טריגונומטריות ואקספוננטיות

$\int u\sin u du = \sin u - u\cos u + C$	1
$\int u\cos u du = \cos u + u\sin u + C$	2
$\int u^2 \sin u du = 2u\sin u + \left(2-u^2\right)\cos u + C$	3
$\int u^2 \cos u du = 2u\cos u + \left(u^2 - 2\right)\sin u + C$	4
$\int u^n \sin u du = -u^n \cos u + n\int u^{n-1}\cos u du$	5
$\int u^n \cos u du = u^n \sin u - n\int u^{n-1}\sin u du$	6
$\int \sin mu \sin nu du = -\frac{\sin(m+n)u}{2(m+n)} + \frac{\sin(m-n)u}{2(m-n)} + C$	7
$\int \cos mu \cos nu du = \frac{\sin(m+n)u}{2(m+n)} + \frac{\sin(m-n)u}{2(m-n)} + C$	8
$\int \sin mu \cos nu du = -\frac{\cos(m+n)u}{2(m+n)} - \frac{\cos(m-n)u}{2(m-n)} + C$	9
$\int xe^{ax}dx = \frac{e^{ax}}{a^2}(ax-1) + C$	10
$\int x^m e^{ax}dx = \frac{x^m e^{ax}}{a} - \frac{m}{a}\int x^{m-1}e^{ax}dx + C$	11
$\int e^{ax}\cos px dx = \frac{e^{ax}\left(a\cos px + p\sin px\right)}{a^2+p^2}$	12
$\int e^{ax}\sin px dx = \frac{e^{ax}\left(a\sin px - p\cos px\right)}{a^2+p^2}$	13
$\int x^m \ln x dx = x^{m+1}\left(\frac{\ln x}{m+1} - \frac{1}{(m+1)^2}\right)$	14

נוסחאות טריגונומטריות

$$\sin^2\alpha = \frac{1-\cos(2\alpha)}{2}\ ,\ \cos^2\alpha = \frac{1+\cos(2\alpha)}{2}$$

$$1+\tan^2\alpha = \frac{1}{\cos^2\alpha} \quad , \quad 1+\cot^2\alpha = \frac{1}{\sin^2\alpha}$$

$$\sin^3\alpha = \frac{1}{4}(3\sin\alpha - \sin(3\alpha))$$

$$\cos^3\alpha = \frac{1}{4}(3\cos\alpha + \cos(3\alpha))$$

$$\cos(2\alpha) = \cos^2\alpha - \sin^2\alpha = 1-2\sin^2\alpha = 2\cos^2\alpha - 1$$

$$\sin(2\alpha) = 2\cos\alpha\sin\alpha$$

$$\sin(\alpha\pm\beta) = \sin\alpha\cos\beta \pm \cos\alpha\sin\beta$$

$$\cos(\alpha\pm\beta) = \cos\alpha\cos\beta\ \mu\ \sin\alpha\sin\beta$$

$$\sin\alpha\ \cos\beta = \frac{1}{2}[\sin(\alpha+\beta)+\sin(\alpha-\beta)] \qquad \cos\alpha\ \sin\beta = \frac{1}{2}[\sin(\alpha+\beta)-\sin(\alpha-\beta)]$$

$$\cos\alpha\ \cos\beta = \frac{1}{2}[\cos(\alpha+\beta)+\cos(\alpha-\beta)] \qquad \sin\alpha\ \sin\beta = \frac{1}{2}[\cos(\alpha-\beta)-\cos(\alpha+\beta)]$$

עבור k,n שלמים מתקיים

$$\cos\pi n = (-1)^n \qquad \cos\frac{\pi n}{2} = \begin{cases} 0, & n=2k-1 \\ (-1)^k, & n=2k \end{cases}$$

$$\sin\pi n = 0 \qquad \sin\frac{\pi n}{2} = \begin{cases} (-1)^{k+1}, & n=2k-1 \\ 0, & n=2k \end{cases}$$

נוסחאות רדוקציה

$$\sin\left(\frac{\pi}{2}-\alpha\right) = \cos\alpha, \qquad \sin\left(\frac{\pi}{2}+\alpha\right) = \cos\alpha$$

$$\cos\left(\frac{\pi}{2}-\alpha\right) = \sin\alpha, \qquad \cos\left(\frac{\pi}{2}+\alpha\right) = -\sin\alpha$$

$$\sin(\pi-\alpha) = \sin\alpha, \qquad \sin(\pi+\alpha) = -\sin\alpha$$

$$\cos(\pi-\alpha) = -\cos\alpha, \qquad \cos(\pi+\alpha) = -\cos\alpha$$

טבלת אינטגרלים

$\int x^{\alpha}dx=\frac{x^{\alpha+1}}{\alpha+1}+C\ ,\ \alpha\neq-1$	$\int\frac{1}{\sin x}\,dx=\ln\left\|\tan\frac{x}{2}\right\|+C$
$\int\frac{dx}{x}=\ln\|x\|+C$	$\int\frac{1}{\cos x}\,dx=\ln\left\|\tan(\frac{x}{2}+\frac{\pi}{4})\right\|+C$
$\int e^{x}dx=e^{x}+C$	$\int\frac{1}{a^2+x^2}\,dx=\frac{1}{a}\arctan\frac{x}{a}+C\quad,\quad a\neq0$
$\int a^{x}dx=\frac{a^{x}}{\ln a}+C\ ,\ a>0$	$\int\frac{1}{x^2-a^2}\,dx=\frac{1}{2a}\ln\left\|\frac{x-a}{x+a}\right\|+C\quad,a\neq0$
$\int\sin x dx=-\cos x+C$	$\int\frac{1}{a^2-x^2}\,dx=\frac{1}{2a}\ln\left\|\frac{x+a}{x-a}\right\|+C\quad,\quad a\neq0$
$\int\cos x dx=\sin x+C$	$\int\frac{1}{\sqrt{a^2-x^2}}\,dx=\arcsin\frac{x}{a}+C\quad,\quad a>0$
$\int\frac{1}{\cos^2 x}dx=\tan x+C$	$\int\frac{1}{\sqrt{x^2\pm a^2}}\,dx=\ln\left\|x+\sqrt{x^2\pm a^2}\right\|+C\quad,\quad a\neq0$
$\int\frac{1}{\sin^2 x}dx=-\cot x+C$	$\int\sqrt{a^2-x^2}\,dx=\frac{x}{2}\sqrt{a^2-x^2}+\frac{a^2}{2}\arcsin\frac{x}{a}+C\ ,\ a>0$
$\int\tan x\ dx=-\ln\|\cos x\|+C$	$\int\sqrt{x^2\pm a^2}\,dx=\frac{x}{2}\sqrt{x^2\pm a^2}+\frac{a^2}{2}\ln\left\|x+\sqrt{x^2\pm a^2}\right\|+C\ ,\ a\neq0$
$\int\cot x\ dx=\ln\|\sin x\|+C$	$\int(f(x)+g(x))dx=\int f(x)dx+\int g(x)dx$
$\int\frac{1}{1+x^2}\,dx=\arctan x+C$	$\int f(g(x))g'(x)dx=F(g(x))+C$
$\int\frac{1}{\sqrt{1-x^2}}\,dx=\arcsin x+C$	$\int f\,'(x)g(x)dx=f(x)g(x)-\int f(x)g\,'(x)dx$