※ Gamma function.

$\Gamma(n) = \int_0^\infty e^{-x} x^{n-1} dx$

① $\Gamma(n+1) = n!$ $(n \in \mathbb{Z})$

② $\Gamma(n) = n \cdot (n-1) \cdots (n-N)\ \Gamma(n-N)$

질문 $\Gamma(\frac{1}{3})$ $\Gamma(4)$ 같은 값들
풀어서 계산해야 함?

Laplace 변환

$L[f(t)](s) = \int_0^\infty e^{-st} f(t)\,dt$

기본함수변환.

(1) $L[0](s) = 0$

(2) $L[1](s) = \frac{1}{s}$

(3) $L[e^{at}](s) = \frac{1}{s-a}$

(4) $L[\sin at](s) = \frac{a}{s^2+a^2}$ (5) $L[\sinh at] = \frac{a}{s^2-a^2}$

(6) $L[\cos at](s) = \frac{s}{s^2+a^2}$ (7) $L[\cosh at] = \frac{s}{s^2-a^2}$

(8) $L[u_H(t-a)](s) = \frac{e^{-as}}{s}$

(9) $L[t^n](s) = \frac{1}{s^{n+1}}\Gamma(n+1) = \frac{n!}{s^{n+1}}$

(10) $L[t^n e^{at}](s) = \frac{n!}{(s-a)^{n+1}}$

변환기본공식.

(1) $L[f+g](s) = L[f](s) + L[g](s)$

(2) $L[cf](s) = cL[f](s)$

선형성

(3) $L[f^{(n)}](s) = s^n L[f](s) - s^{n-1}f(0) - s^{n-2}f'(0) - \cdots - sf^{(n-2)}(0) - f^{(n-1)}(0)$

(4) $L[\int_0^t f(\eta)d\eta](s) = \frac{1}{s}L[f](s)$

(5) $L[e^{bt}f(t)](s) = L[f(t)](s-b)$

(6) $L[t^n f(t)](s) = (-1)^n \frac{d^n}{ds^n} L[f(t)](s)$

(7) $L[u_H(t-b)f(t-b)](s) = e^{-sb}L[f(t)](s)$

Laplace 역변환.

합성곱 ; $(f*g)(t) = \int_0^t f(t-\tau)g(\tau)d\tau$

$L[f*g](s) = F(s)G(s)$

$L^{-1}[FG](s) = (f*g)(t)$.