Universidade de Aveiro, Departamento de Matemática
CÁLCULO II – Agrupamento 1 - 2017/18.

Formulário de Derivadas

Função	Derivada	Função	Derivada
K	0	$\ln\lvert u\rvert$	$\frac{u'}{u}$
u^r	$r\,u^{r-1}\,u'$	$\log_a \lvert u\rvert\,(a>0 \text{ e } a\neq 1)$	$\frac{u'}{u\ln a}$
e^u	$u'\,e^u$	$a^u\,(a>0 \text{ e } a\neq 1)$	$a^u\,\ln a\,u'$
$\operatorname{sen} u$	$u'\,\cos u$	$\cos u$	$-u'\,\operatorname{sen} u$
$\operatorname{tg} u$	$u'\sec^2 u$	$\operatorname{cotg} u$	$-u'\,\operatorname{cosec}^2 u$
$\sec u$	$\sec u\,\operatorname{tg} u\,u'$	$\operatorname{cosec} u$	$-\operatorname{cosec} u\,\operatorname{cotg} u\,u'$
$\operatorname{arcsen} u$	$\frac{u'}{\sqrt{1-u^2}}$	$\arccos u$	$-\frac{u'}{\sqrt{1-u^2}}$
$\operatorname{arctg} u$	$\frac{u'}{1+u^2}$	$\operatorname{arccotg} u$	$-\frac{u'}{1+u^2}$

Duas primitivas

Função	Primitiva
$u'\sec u$	$\ln\lvert\sec u+\operatorname{tg} u\rvert$
$u'\operatorname{cosec} u$	$-\ln\lvert\operatorname{cosec} u+\operatorname{cotg} u\rvert$

Algumas fórmulas trigonométricas

$\sec u=\frac{1}{\cos u}$	$\cos^2 u=\frac{1}{2}(1+\cos(2u))$
$\operatorname{cosec} u=\frac{1}{\operatorname{sen} u}$	$\operatorname{sen}^2 u=\frac{1}{2}(1-\cos(2u))$
$1+\operatorname{tg}^2 u=\sec^2 u$	$1+\operatorname{cotg}^2 u=\operatorname{cosec}^2 u$
$\operatorname{cotg} u=\frac{\cos u}{\operatorname{sen} u}$	$\operatorname{sen}(u+v)=\operatorname{sen} u\cos v+\operatorname{sen} v\cos u$
$\cos(u+v)=\cos u\cos v-\operatorname{sen} u\operatorname{sen} v$	$\operatorname{sen} u\operatorname{sen} v=\frac{1}{2}(\cos(u-v)-\cos(u+v))$
$\cos u\cos v=\frac{1}{2}(\cos(u-v)+\cos(u+v))$	$\operatorname{sen} u\cos v=\frac{1}{2}(\operatorname{sen}(u-v)+\operatorname{sen}(u+v))$

Progressões aritmética e geométrica (de razão r)

Progressão	Termo geral	Soma dos n 1^{os} termos
Aritmética	$u_n=u_1+(n-1)r$	$S_n=\frac{u_1+u_n}{2}\,n$
Geométrica	$u_n=u_1\,r^{n-1}$	$S_n=u_1\,\frac{1-r^n}{1-r}\quad(r\neq 1)$

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Formulário Transformadas de Laplace $\quad(\mathcal{L}\{f(t)\}(s) = \int_0^{+\infty} e^{-st} f(t)dt)$

$F(s) = \mathcal{L}\{f(t)\}(s)$, $s > s_f$; $\quad G(s) = \mathcal{L}\{g(t)\}(s)$, $s > s_g$.

$f(t)$	$F(s)$
1	$\frac{1}{s}$, $\quad s > 0$
t^n $(n \in \mathbb{N}_0)$	$\frac{n!}{s^{n+1}}$, $\quad s > 0$
e^{at} $(a \in \mathbb{R})$	$\frac{1}{s-a}$, $\quad s > a$
$sen(at)$ $(a \in \mathbb{R})$	$\frac{a}{s^2+a^2}$, $\quad s > 0$
$cos(at)$ $(a \in \mathbb{R})$	$\frac{s}{s^2+a^2}$, $\quad s > 0$
$senh(at)$ $(a \in \mathbb{R})$	$\frac{a}{s^2-a^2}$, $\quad s > \|a\|$
$cosh(at)$ $(a \in \mathbb{R})$	$\frac{s}{s^2-a^2}$, $\quad s > \|a\|$
$f(t) + g(t)$	$F(s) + G(s)$, $\quad s > s_f, s_g$
$\alpha\, f(t)$ $(\alpha \in \mathbb{R})$	$\alpha\, F(s)$, $\quad s > s_f$
$e^{\lambda t} f(t)$ $(\lambda \in \mathbb{R})$	$F(s-\lambda)$, $\quad s > s_f + \lambda$
$H_a(t)f(t-a)$ $(a > 0)$	$e^{-as}F(s)$, $\quad s > s_f$
$H(t-a)f(t-a)$ $(a > 0)$	$e^{-as}F(s)$, $\quad s > s_f$
$f(at)$ $(a > 0)$	$\frac{1}{a}F(\frac{s}{a})$, $\quad s > as_f$
$t^n f(t)$ $(n \in \mathbb{N})$	$(-1)^n F^{(n)}(s)$, $\quad s >$ ordem exp. de f
$f'(t)$	$s\, F(s) - f(0)$, $\quad s >$ ord. exp. de f
$f''(t)$	$s^2\, F(s) - s\, f(0) - f'(0)$, $\quad s >$ ordens exp. de f, f'
$f^{(n)}(t)$	$s^n\, F(s) - \sum_{k=1}^{n} s^{n-k} f^{(k-1)}(0)$, onde $f^{(0)} \equiv f$, $\quad s >$ ordens exp. de $f, f', \ldots, f^{(n-1)}$
$f(t) * g(t) = \int_0^t f(u)g(t-u)du$	$F(s)G(s)$