

# 1 Tabla de Derivadas

## 2 Operador Lineal

- 1)  $D[f + g + \dots] = D[f] + D[g] + \dots$
- 2)  $D[af] = a \cdot D[f]$
- 3)  $D[af + bg + \dots] = a \cdot D[f] + b \cdot D[g] + \dots$

## 3 Producto - Cociente

- 1)  $D[u(x) \cdot v(x)] = u'v + uv'$
- 2)  $D\left[\frac{u(x)}{v(x)}\right] = \frac{u'v - uv'}{v^2}$

## 4 Función Compuesta: $y = f[u(x)]$ Regla de la cadena

$y \rightarrow u \rightarrow x$

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dx}$$

$y' = f'[u(x)] \cdot u'(x)$

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$y = f[u(v(x))]$

$y \rightarrow u \rightarrow v \rightarrow x$

$$\frac{dy}{dx} = \frac{dy}{du} \cdot \frac{du}{dv} \cdot \frac{dv}{dx}$$

$y' = f'[u(x)] \cdot u'(v) \cdot v'(x)$

## 5 Función Inversa

$$\frac{dy}{dx} = \frac{1}{dx/dy}$$

*Ejemplos:*

- 1)  $y = \text{Arc sen } x \Leftrightarrow x = \text{sen } y$   

$$y' = \frac{1}{\text{cos } y} = \frac{1}{\sqrt{1 - \text{sen}^2 y}} = \frac{1}{\sqrt{1 - x^2}}$$
- 2)  $y = \text{Arg Sh } x \Leftrightarrow x = \text{Sh } y$   

$$y' = \frac{1}{\text{Ch } y} = \frac{1}{\sqrt{1 + \text{Sh}^2 y}} = \frac{1}{\sqrt{1 + x^2}}$$

| y                       | y'   |
|-------------------------|--|
| $x^n$                   | $nx^{n-1}$   |
| $\sqrt[n]{x} = x^{1/n}$ | $\frac{1}{n} x^{1/n-1}$                              |
| $\sqrt{x}$              | $1/\sqrt{x}$   |
| $e^x, a^x$              | $e^x, a^x \ln a$                                     |
| $L_n x; L_n  x $        | $1/x$  |
| $\text{sen } x$         | $\text{cos } x$                                      |
| $\text{cos } x$         | $-\text{sen } x$                                     |
| $\text{tg } x$          | $\frac{1}{\text{cos}^2 x} = 1 + \text{tg}^2 x$       |
| $\text{cotg } x$        | $\frac{-1}{\text{sin}^2 x} = -(1 + \text{cotg}^2 x)$ |
| $\text{Arcsen } x$      | $\frac{1}{\sqrt{1-x^2}}$                             |
| $\text{Arccos } x$      | $\frac{-1}{\sqrt{1-x^2}}$                            |
| $\text{Arc tg } x$      | $\frac{1}{1+x^2}$                                    |
| $\text{Arc cotg } x$    | $\frac{-1}{1+x^2}$                                   |
| $\text{Sh } x$          | $\text{Ch } x$                                       |
| $\text{Ch } x$          | $\text{Sh } x$                                       |
| $\text{Th } x$          | $\frac{1}{\text{Ch}^2 x} = 1 - \text{Th}^2 x$        |
| $\text{Cth } x$         | $\frac{-1}{\text{Sh}^2 x} = 1 - \text{Cth}^2 x$      |
| $\text{ArgSh } x$       | $\frac{1}{\sqrt{x^2 + 1}}$                           |
| $\text{ArgCh } x$       | $\frac{1}{\sqrt{x^2 - 1}}$                           |
| $\text{ArgTh } x$       | $\frac{1}{1 - x^2}$                                  |
| $\text{ArgCth } x$      | $\frac{1}{1 - x^2}$                                  |

## 6 Función Implícita

$f[x, y] = 0$

$f \begin{cases} x \\ y \end{cases} \frac{s}{x}$

- 1)  $f'_x + f'_y \cdot y' = 0$
- 2)  $y' = \frac{-f'_x}{f'_y}$

## 7 Derivación Logarítmica

*Ejemplo:*

Función potencial-exponencial

$y = u^v / u = u(x), v = v(x)$

- I)  $\ln y = v \cdot \ln u$
- II)  $\frac{1}{y} \cdot y' = v' \cdot \ln u + v \cdot \frac{u'}{u}$
- III)  $y' = y \left[ v' \cdot \ln u + v' \cdot \frac{u'}{u} \right]$