BIE 5786 - Ecologia de Populações

Roberto André Kraenkel

http://www.ift.unesp.br/users/kraenkel

Resumo de Cálculo Diferencial e Integral

Derivação

$$\frac{df}{dt} = \lim_{h\to 0} \frac{f(t+h)-f(t)}{h} \equiv f'(t)$$

Derivadas elementares	
$f(t)$	$f'(t)$
t^n	nt^{n-1}
e^t	e^t
$\ln(x)$	$1/x$
$\sin(x)$	$\cos(x)$
$\cos(x)$	$-\sin(x)$
Regras de derivação	
$(f(t)+g(t))'$	$f'(t)+g'(t)$
$(f(t)\cdot g(t))'$	$f'(t)\cdot g(t)+f(t)\cdot g'(t)$
$f(g(t))'$	$f'(g(t))\cdot g'(t)$

Exemplos Simples

$f(t)$	$f'(t)$	$f(t)$	$f'(t)$
t^2	$2t$	t^3	$3t^2$
$1/t$	$-1/t^2$	$1/(t+1)$	$-1/(t+1)^2$
$t^{1/2}$	$-1/2t^{1/2}$	$t^{-1/2}$	$-\frac{1}{2}t^{-3/2}$
$\frac{1}{t+1}$	$-\frac{1}{(t+1)^2}$	$\frac{1}{t^2+1}$	$-\frac{2t}{(t^2+1)^2}$
e^{2t}	$2e^{2t}$	$4e^{2t}$	$8e^{2t}$
e^{t^2}	$2te^{t^2}$	$e^{1/t}$	$-\frac{1}{t^2}e^{1/t}$
$\sin(2t)$	$2\cos(t)$	$\sin(t+1)$	$\cos(t+1)$
$\sin(t^2)$	$2t\cos(t^2)$	$\sin(-2t^2)$	$-4t\cos(-2t^2)$
$\cos(t+1)$	$-\sin(t+1)$	$\cos(t^2+2)$	$-2t\sin(t^2+2)$
$\ln(-t)$	$-1/t$	$\ln(t+1)$	$1/(t+1)$
$\ln(t^2)$	$2/t$	$t\ln(t)$	$\ln(t)+1$
$\sin(t)\cdot\ln(t)$	$\cos(t)\cdot\ln(t)+\sin(x)/x$	$\cos(1/t)$	$\frac{\sin(1/t)}{t^2}$
$t^2e^{1/t}$	$e^{1/t}(2t-1)$	$te^{\sqrt{t}}$	$(1+\frac{\sqrt{t}}{2})e^{\sqrt{t}}$

Integração

$\int^t (\frac{df}{dt})dt = f(t)$ A integral *indefinida* é a antiderivada

$f(t)$	$\int^t f(t)dt$
t^n	$\frac{t^{n+1}}{n+1}$
e^t	e^t
$1/x$	$\ln(x)$
$\sin(x)$	$-\cos(x)$
$\cos(x)$	$\sin(x)$
e^{at}	e^{at}/a
$\sin(at)$	$-\cos(at)/a$
$\ln(t)$	$t(\ln(t)-1)$

Sempre a menos de uma constante arbitrária