

Template functions

Function f in $d(f, x)$ does not have to be defined, it can be a template function with just a name and an argument list. The argument list determines the result. For example, $d(f(x), x)$ evaluates to itself because f depends on x . However, $d(f(x), y)$ evaluates to zero because f does not depend on y .

Example 1. $f(x)$ depends on x .

$d(f(x), x)$

$d(f(x), x)$

Example 2. $f(x)$ does not depend on y .

$d(f(x), y)$

0

Example 3. $f(x, y)$ depends on both x and y .

$d(f(x, y), y)$

$d(f(x, y), y)$

Example 4. $f()$ is a wildcard that matches any symbol.

$d(f(), t)$

$d(f(), t)$

Template functions are useful for working with differential forms. For example, show that

$$\nabla \cdot (\nabla \times \mathbf{F}) = 0$$

$F = (Fx(), Fy(), Fz())$
 $\text{div}(\text{curl}(F))$

0