

CDI-II

Regra da cadeia

Exercícios

1. Dadas as funções abaixo, calcule as derivadas parciais:

(a) $f(x, y) = xy^2$; $u = x^2 + y$; $u = x^2 - y^2$;
 $\frac{\partial f}{\partial x}(u, v)$

(b) $f(x, y) = 2x^2 + 3y^2$; $u = x + y + z$; $v = \frac{1}{x^2yz}$;
 $\frac{\partial f}{\partial z}(u, v)$

(c) $f(x, y, z) = \frac{x^2 \cdot z}{y^2 + 1}$; $u = x^2$; $v = x^2 + y^2$
 $\frac{\partial f}{\partial y}(u, v)$

(d) $f(x, y) = x^2 + yx$; $u = t + \frac{1}{t}$; $v = t^2$;
 $\frac{df}{dt}(u, v)$

(e) $f(x, y, z) = \frac{1}{x^2 + y^2 + z^2}$; $u = \cos t$; $v = \sin t$; $w = t$
 $\frac{df}{dt}(u, v, w)$

(f) $f(t) = t^2 - t^3$; $u = x^2y$
 $\frac{\partial f}{\partial y}(u)$

(g) $f(t) = \sqrt{t^2 + 1}$; $u = x^2 + y^2 + z^2$
 $\frac{\partial f}{\partial x}(u)$; $\frac{\partial f}{\partial y}(u)$; $\frac{\partial f}{\partial z}(u)$;

2. Seja $f(x, y)$ uma função derivável e considere $F(x, y) = f\left(\frac{x}{y}, \frac{y}{x}\right)$. Mostre que $x \frac{\partial F}{\partial x} + y \frac{\partial F}{\partial y} = 0$