18MAB101T- CALCULUS AND LINEAR ALGEBRA

Assignment

If $u = x^2$ and $v = y^2$ find $\dfrac{\partial(u,v)}{\partial(x,y)}$

1. If $x = u^2 - v^2$ and $y = 2uv$ find the Jacobian of x and y with respect to u and v.

2. If $u = x^2 - 2y, v = x + y$ prove that $\dfrac{\partial(u,v)}{\partial(x,y)} = 2x + 2$

3. If $x = u(1-v), y = uv$, verify that $\dfrac{\partial(x,y)}{\partial(u,v)} \dfrac{\partial(u,v)}{d(x,y)} = 1$

4. If $x = e^u \cos v, y = e^u \sin v$ find $\dfrac{\partial(x,y)}{\partial(u,v)}$

5. Find the Jacobian of y_1, y_2, y_3 with respect to x_1, x_2, x_3 if

$y_1 = \dfrac{x_2 x_3}{x_1}, y_2 = \dfrac{x_3 x_1}{x_2}, y_3 = \dfrac{x_1 x_2}{x_3}$.

6. Determine whether $u = y + z, v = x + 2z^2, w = x - 4yz - 2y^2$ are functionally dependent. If so find the relation between them.

7. If $x = r\cos\theta, y = r\sin\theta, z = z$ find $\dfrac{\partial(x,y,z)}{\partial(r,\theta,z)}$.

8. Determine whether $u = \dfrac{x+y}{x-y}$ and $v = \dfrac{xy}{(x-y)^2}$ are functionally dependent. If so find the relation between them.

10. If $F = xu + v - y, G = u^2 + vy + w, H = zu - v + vw$. Compute $\dfrac{\partial(F,G,H)}{\partial(u,v,w)}$