Lecture 14 Worksheet

June 10, 2021

1. Calculate $\frac{dz}{dt}$, where $z = f(x, y) = \sqrt{x^2 - y^2}$, $x = e^{2t}$, and $y = e^{-t}$.
2. If $f(x, y) = x^2 - y^2$, $x = r\cos(t)$, and $y = r\sin(t)$, find $\frac{\partial f}{\partial t}$.
3. Find the equation of the tangent plane to the surface

   $$xy^2 + yz^2 - zx^2 = 1$$

   at the point $(1, 1, 1)$.
4. If $xy + yz + zx + \sin(xyz) = 4$, find $\frac{\partial z}{\partial x}$ at $(2, 2, 0)$.
5. Let $x^3 + y^3 = \tan(xy)$. Find $\frac{dy}{dx}$.