

4 For Lecture on 10/8

1. Let $F(x, y, z) = (xy, z \sin y)$ and $G(u, v) = (u + v, u^2, e^v)$. Find the Jacobians DF , DG and $D(F \circ G)$.
2. Find the tangent plane of the function $u(s, t)$ given by $u = x^4y + y^2z^3$ and $x = se^t$, $y = s^2e^{-t}$ and $z = s \sin t$ at point $(s, t) = (1, 0)$.
3. * If $c(t)$ is a differentiable vector-valued function with the restriction that length of $c(t)$ remain constant, prove that $c(t)$ is perpendicular to $c'(t)$.