

Math 2551 Worksheet Section 14.6

1. Find the equations for the tangent plane and normal line at the point $P_0(0, 1, 2)$ of the surface

$$\cos(\pi x) - x^2 y + e^{xz} + z = 4.$$

2. Let

$$f(x, y, z) = e^x \cos(yz).$$

Estimate the change df in f , where we move $ds = 0.1$ in the direction $\vec{v} = 2\hat{i} + 2\hat{j} - 2\hat{k}$ from a general point $P_0(x, y, z)$ and in particular at $(0, 0, 0)$.

3. Find parametric equations for the line tangent to the curve of intersection of the surfaces

$$xyz = 1 \quad \text{and} \quad x^2 + 2y^2 + 3z^2 = 6$$

at the point $(1, 1, 1)$.

4. Find the linearization of $f(x, y, z) = \tan^{-1}(xyz)$ at $(1, 1, 0)$.
5. Find the linearization of the function $f(x, y) = 1 + y + x \cos y$ at $P_0(0, 0)$ and find an upper bound for the magnitude $|E|$ of the error in the approximation over the rectangle $R: |x| \leq 0.2, |y| \leq 0.2$.