Surfaces

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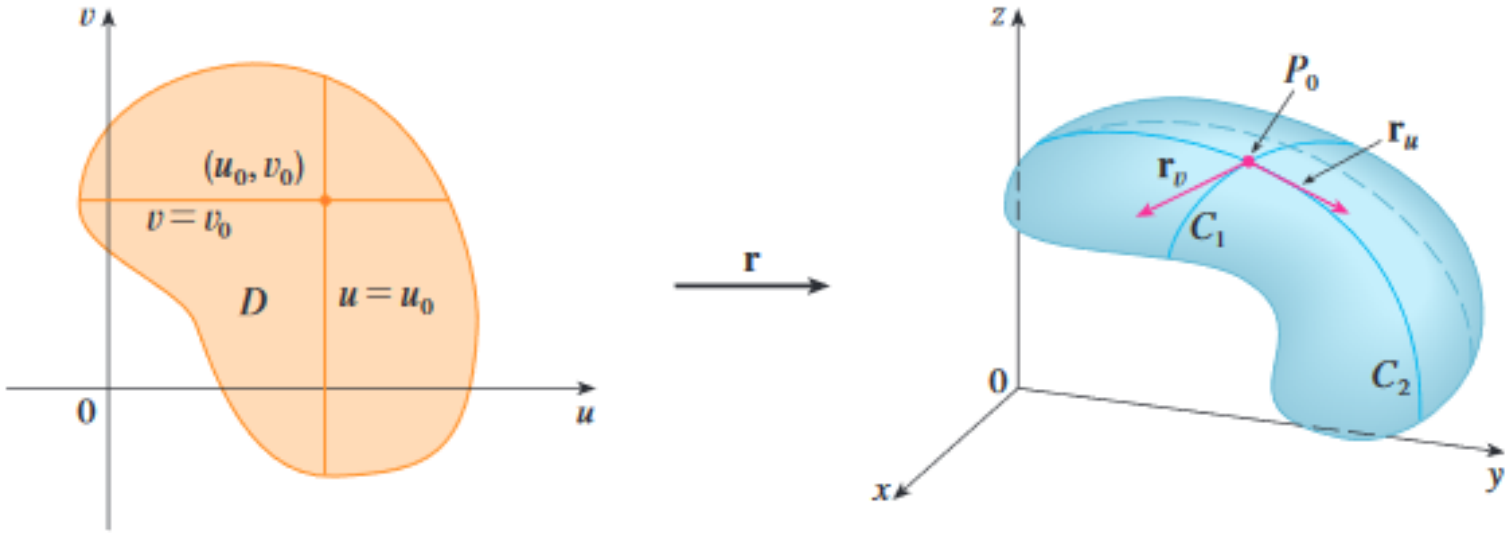
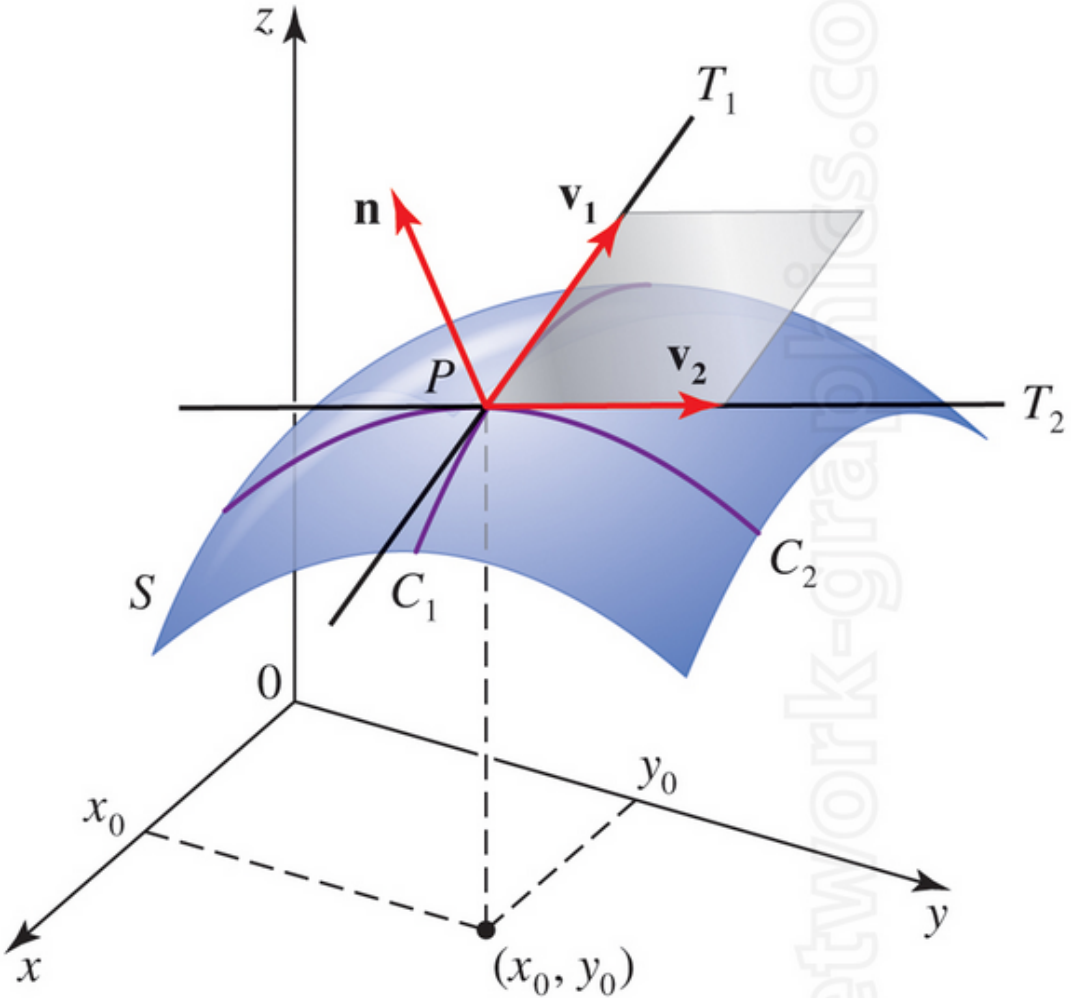

v
(u0, v0)
v = v0
D
u = u0
0
u
r
z
P0
ru
rv
C1
C2
0
x
y



http://www.network-graphics.com/images/calculus/normal_plane_m.jpg

Surfaces Practice Problems

1. Find two different parametrizations for the parabaloid $x^2 + y^2 + z = 1$.

2. Let $\mathcal{S}$ be the surface parametrized by $G(u, v) = (u^2 - v^2, u + v, u - v)$. Find $\mathbf{T}_u$, $\mathbf{T}_v$ and $\mathbf{N}$. What are they at the point $(u, v) = (2, 3)$? Find the tangent plane to $\mathcal{S}$ at the point $(2, 3)$.

Challenge Problems

1. A surface is **regular** at a point P if $\mathbf{N}(P) \neq 0$. Find all the points in the surface parametrized by $G(u, v) = (u^2 - v^2, u^2 + v^2, v)$ that are NOT regular.
2. Develop a formula for the tangent plane to the surface parametrized by $x = h(y, z)$ at the point (x_0, y_0, z_0).