Lecture 14 (7.3, 7.4)

Math 20E
James Dilts

May 7, 2018
There are infinitely many possible tangent vectors. Why are $T_u$ and $T_v$ special? Why did we pick them?

(a) They tell us something important about our surface.
(b) They’re the only way to calculate the tangent plane and normal vector.
(c) They tell us something important about our parameterization.
(d) They’re not particularly special except that they’re easy to calculate.
(e) They aren’t really special at all.
2.

Use $T_u$ and $T_v$ to find a parametric representation of the tangent plane of the parametric surface $F(u, v)$ at $(u_0, v_0)$. 

(a) $(u, v, F(u, v))$

(b) $u T_u + v T_v + F(u_0, v_0)$

(c) $(u, v, u T_u + v T_v)$

(d) $(u_0, v_0, F(u_0, v_0)) \cdot (T_u \times T_v)$

(e) None of these are correct.
Use $T_u$ and $T_v$ to find a parametric representation of the tangent plane of the parametric surface $F(u, v)$ at $(u_0, v_0)$.

(a) $(u, v, F(u, v))$
(b) $uT_u + vT_v + F(u_0, v_0)$
(c) $(u, v, uT_u + vT_v)$
(d) $(u_0, v_0, F(u_0, v_0)) \cdot (T_u \times T_v)$
(e) None of these are correct.
Under what conditions is $T_u \times T_v = \vec{0}$?
Under what conditions is $T_u \times T_v = \vec{0}$?

(a) When either of them are zero.
(b) When they are pointing in the same (or opposite) direction.
(c) When they are orthogonal to each other.
(d) Either a or b.
(e) Either a or c.
4.

For $F(u, v) = (u, v, u + v)$, find the area of the graph on the domain $(u, v) \in [0, 1] \times [0, 1]$.

(a) 1
(b) $\sqrt{2}$
(c) $\sqrt{3}$
(d) 2
(e) None of these are correct.