

Lecture 6: Appendix B Differential, 2.2 Regular Surface.

We started with going the definition of the differential of a map from in Appendix B to Chapter 2:

We did Example 9 of a curve going through a point in any direction.

We also did the definition 1 of the differential of a map from \mathbf{R}^n to \mathbf{R}^m .

We also proved Proposition 7, that the differential is independent of the particular curve going through the point with the same tangent vector.

Then we went back to Section 2.2 about regular surfaces:

We proved Proposition 1 that graph is a regular surface.

We went over definition 2, what is meant by a regular value of a function.

We also started to prove Proposition 2, that if a is a regular value then $f(x, y, z) = a$ is a regular surface. This however required the use of the inverse function theorem from Appendix B that we just had time to mention briefly. We also did the example showing that if $f(x, y, z) = z^2 - x^2 - y^2 = a$, then $a = 0$ is not a regular value.

We also mentioned Proposition 3 that if S is a regular surface and $p \in S$ that close to p S can be written as graph over one of the coordinate planes.

The author suggests that one omits the proofs in Section 2.2 at the first reading so we will come back to the proofs and the proof of the Inverse Function theorem later on.