<<隐函数定理>>

图书基本信息

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作者：（美）克朗兹　著

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内容概要

The implicit function theorem is. along with its close cousin the inverse func- tion theorem, one of the most important, and one of the oldest, paradigms in modcrn mathemarics. One can see the germ of the idea for the implicir func tion theorem in the writings of Isaac Newton (1642-1727), and Gottfried Leib-niz's (1646-1716) work cxplicitty contains an instance of implicit differentiation.

Whilc Joseph Louis Lagrange (1736-1813) found a theorcm that is essentially a version of the inverse function theorem, ic was Augustin-Louis Cauchy (1789-1857) who approached the implicit function theorem with mathematical rigor and it is he who is gencrally acknowledgcd as the discovcrer of the theorem. In Chap-ter 2, we will give details of the contributions of Newton, Lagrange, and Cauchy to the development of the implicit function theorem.

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作者简介

作者：（美国）克朗兹（Steven G.Krantz） （美国）Harold R.Parks

书籍目录

章节摘录

版权页： 插图： The picture we would like to see for the curve (t(s), x(s)) along which (4.10) holds should resemble that in Figure 4. l (a). It would be even better if the curve resembled that in Figure 4. I(b), because in that case we could parameterize the curve by t itself. On the other hand, it is conceivable that the solution set of H(t, x) = 0 might look like that in Figure 4.2 where, starting from a zero of the form H (0, x0),we can never arrive at a zero of the form H(I, xl). Notice that there are four types of bad behavior for {(t, x) : H(t, x) = 0} in Figure 4.2: (I) A curve starts at t=0, but doubles back without ever getting to t = I, (2) a curve becomes unbounded in x, (3) a curve reaches a bifurcation point where curves cross, and (4) a curve comes to a dead end where it cannot be continued. All of these instances of bad behavior are possible; nonetheless they all can be ruled out by imposing some simple hypotheses and applying the implicit function theorem. To illustrate the ideas, we first state a theorem in which we can show that the curve H(t(s), x(s)) = 0 has the nice form shown in Figure 4. 1(b). Theorem 4.2,1 Let U be an open subset of RN. Suppose that H is continuously differentiable in an open set containing [0, I] x U, that the function Fo given by F0(x)=H(0, x) ning with the 1764 award given by the Paris Academy of Sciences for his paper on the libration of the moon.4A basic result in celestial mechanics is Kepler's equation E = M + esin(E), (2.15) where M is the mean anomaly,5 E is the eccentric anomaly, and e is the eccen-tricity of the orbit. We will describe these quantities in more detail later. For the moment, we note that M and e should be considered to be the quantities that can be measured and that e is assumed to be small. One of Lagrange's theorems, now called the Lagrange Inversion Theorem, gave a formula for the correction that must be made when, for some function ψ(.), ψ(M) is replaced by ψ(E).

编辑推荐

《隐函数定理(英文)》介绍了隐函数定理的基本知识，是全英文版。
在数学中，隐函数定理是一个描述关系以隐函数表示的某些变量之间是否存在显式关系的定理。