

THE IMPLICIT FUNCTION THEOREM AND IMPLICIT PARAMETRIZATIONS*

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Abstract

We discuss a differential equations treatment of the implicit functions problem. Our approach allows a precise and complete description of the solution, of continuity and differentiability properties. The critical case is also considered.

The investigation is devoted to dimension two and three, but extensions to higher dimension are possible.

MSC: 26B10, 34A12, 53A05.

keywords: implicit function theorem, differential equations, parametrization, generalized solutions, variations.

1 Introduction

The implicit function theorem is a classical subject and I just quote two monographs, Krantz and Parks [14], Dontchev and Rockafellar [9], providing rich information on this topic, from Dini's work to recent research results. Let me mention the constructive approaches of Bridges et al [2], Diener and Schuster [8], the nonsmooth variants of Robinson [21], Clarke [6], Dontchev and Rockafellar [9], the continuous locally injective case of Kumagai [15] and

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