Dedicated to *Christina*

Preface

In recent years, two (at first glance) quite different fields of mathematical interest have attracted my attention.

- Elliptic variational problems with linear growth conditions. Here the notion of a "solution" is not obvious and, in fact, the point of view has to be changed several times in order to get some deeper insight.
- The study of the smoothness properties of solutions to convex anisotropic variational problems with superlinear growth.

It took some time to realize that, in spite of the fundamental differences and with the help of some suitable theorems on the existence and uniqueness of solutions in the case of linear growth conditions, a non-uniform ellipticity condition serves as the main tool towards a unified view of the regularity theory for both kinds of problems.

This is roughly speaking the background of my habilitations thesis at the Saarland University which is the basis for this presentation.

Of course there is a long list of people who have contributed to this monograph in one or the other way and I express my thanks to each of them. Without trying to list them all, I really want to mention:

Prof. G. Mingione is one of the authors of the joint paper [BFM]. The valuable discussions on variational problems with non-standard growth conditions go much beyond this publication.

Prof. G. Seregin took this part in the case of variational problems with linear growth.

Large parts of the presented material are joint work with Prof. M. Fuchs: this, in the best possible sense, requires no further comment. Moreover, I am deeply grateful for the numerous discussions and the helpful suggestions.

Saarbrücken, April 2003   *Michael Bildhauer*