

Preface

Deformation theory has the reputation of being a difficult subject, for which no good literature is available. The main obstacle to understand most of the existing texts is their level of generality. But many of the problems one has to confront already occur in the by now well established theories of deformations of compact complex manifolds (Kodaira–Spencer theory) and of universal unfoldings of function germs (Thom–Mather theory). When I wrote my Habilitationsschrift in Hamburg, of which these notes are an outgrow, I decided to start with some introductory chapters on deformation theory. The warning to prospective authors of popular books on science, that each mathematical formula will cut down the readership by half, applies *mutatis mutandis* to the use of cofibred categories. They seem abstract nonsense, but in fact versality has its most natural formulation in these terms. There is a certain discongruity between general theory and practical computations, of which I have been doing quite a lot during the last years. One point I want to make, is that both can be understood as the problem of solving a deformation equation.

Having one's papers (since 1989) on file, tempts one to 'recycle' old work. But I do hope that the slow process of revising, which lead to the present text, at least removed some of the mistakes.

It is a pleasure to thank all those, who contributed in one form or another to the existence of these notes. Especially I want to thank Kurt Behnke for the many discussions during our common time in Hamburg. For conversations, which among others helped me shape my ideas, I am grateful to Duco van Straten, Ragnar Buchweitz, Jan Christophersen, Theo de Jong, Miles Reid and Jonny Wahl (this is a non-exhaustive list). I thank Oswald Riemen-schneider and the participants of his 'Seminar über Komplexe Analysis' in Hamburg. I thank the former European Singularity Project and its successor for the environment it created, and its organisers for their efforts. I especially thank Gert-Martin Greuel, Dirk Siersma, and Terry Wall. Thanks to Klaus Altman for finding mistakes in the originally submitted Habilitationsschrift.

I could not have computed so many examples without computer use, more specifically the computer program *Macaulay* [BS]. Therefore thanks to Dave Bayer and Mike Stillman, and David Eisenbud for his scripts. I managed to

enlighten the text with some real pictures thanks to the program *surf* by Stephan Endraß [En].

Göteborg, August 2002.

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<http://www.springer.com/978-3-540-00560-5>

Deformations of Singularities

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2003, X, 166 p., Softcover

ISBN: 978-3-540-00560-5