Preface

The present volume is published in honor of the sixtieth birthdays of Reiko Miyaoka and Keizo Yamaguchi. It focuses on hypersurfaces, differential systems, symmetric spaces, and minimal surfaces. Each paper gives new results or a brief survey in these areas.

The research interests of Professor Reiko Miyaoka cover a wide field, including hypersurfaces, Lie contact structures, minimal surfaces, harmonic maps, integrable systems, and here we mention some highlights. One impressive paper was concerned with an important invariant for hypersurfaces in space forms, called the Lie curvature. She gave counterexamples to a conjecture related to a correspondence between a compact embedded Dupin hypersurfaces with four distinct principal curvatures and isoparametric hypersurfaces in a sphere. She established a correspondence between conformal flatness for a Riemannian manifold and flatness for a unitary tangent bundle, which solved a problem suggested by H. Sato. She developed the conjecture (S. T. Yau's 34th problem) which is concerned with homogeneity for isoparametric hypersurfaces in spheres.

Professor Keizo Yamaguchi introduced the notion of higher order contact manifolds (or higher order jet bundles) and contact transformations of higher order by higher order prolongations of a contact manifold. He clarified the geometric structure of jet bundles and characterized locally the canonical differential systems on jet bundles. He established the notion of a PD manifold and contact equivalence of involutive systems by analyzing the geometric structure which submanifolds of jet bundles possess. In particular, he developed a geometric theory of systems of partial differential equations of second order for a scalar function as the contact geometry of second order by E. Cartan. He established the geometry associated with simple graded Lie algebras in the sense of N. Tanaka which is now called parabolic geometry.

An international conference on differential systems and the theory of hypersurfaces was held at the Research Institute for Mathematical Sciences (RIMS), Kyoto University, Japan during the period 24–28 January 2011 in honor of their sixtieth birthdays. With deep admiration and respect, the organizers dedicate the present volume to Professors Reiko Miyaoka and Keizo Yamaguchi.

The Organizing Committee:
  Toshihiro Shoda (Saga University, Japan)
  Kazuhiro Shibuya (Hiroshima University, Japan)

All papers in this volume have been refereed and are in final form. No version of any of them will be submitted for publication elsewhere.