

Preface

The gyroscope, which measures angular rotation around a fixed axis with respect to an inertial space, is a key sensor in modern navigation systems enabling to plan, record and control the movement of a vehicle from one place to another. This device has a wide spectrum of applications in space engineering, aeronautical and military industry, automotive, medicine and so on. For these reasons gyro architectures and technologies have been investigated by very important research groups in USA, Europe and Asia. National space agencies of a number of Countries have invested significant financial resources for developing innovative gyroscope technologies. Results of this intense research effort have been reported in a large number of scientific papers and patents.

The purpose of the book is to collect and critically review the main results obtained by the scientific community in advanced gyroscope technologies. Architectures, design techniques and fabrication technology of angular rate sensors proposed in literature are described. Future research trends aimed to cover special applications are also considered.

The book is intended for researchers and Ph.D. students interested in modelling, design and fabrication of gyros. It may be a useful education support in some university courses focused on gyro technologies.

In recent years the authors have spent an intense research effort on optical angular velocity sensors working on some specific projects supported by some space agencies. They use their deep know-how on different gyroscope technologies to offer to the readers a wide vision about the book subject.

The book includes seven chapters. First two chapters introduce the topic and briefly describe physical effects exploited in gyroscope technologies. [Chapters 3, 4 and 5](#) are focused on optical gyros. State-of-the-art of ring laser gyros, fiber optic gyros and integrated optical gyros is accurately reviewed. Vibratory gyros and, in particular, MEMS gyros are the topic of [Chap. 6](#), where MOEMS gyros are also introduced. Finally, the book topic is summarized in [Chap. 7](#) that offers also an

overview of the most innovative technologies for angular rate sensors with outstanding performance.

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