1. Record Nr. UNINA9910821633803321

Autore	Ma Xu <1983->
Titolo	Computational lithography / / Xu Ma and Gonzalo R. Arce
Pubbl/distr/stampa	Oxford, : Wiley-Blackwell, 2010
ISBN	9786612755965 9781118043578 111804357X 9781282755963 128275596X 9780470618943 0470618949 9780470618936 0470618930
Edizione	[1st edition]
Descrizione fisica	1 online resource (244 p.)
Collana	Wiley series in pure and applied optics
Altri autori (Persone)	ArceGonzalo R
Disciplina	621.381531
Soggetti	Microlithography - Mathematics Integrated circuits - Design and construction - Mathematics Photolithography - Mathematics Semiconductors - Etching - Mathematics Resolution (Optics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Computational Lithography -- Contents -- Preface -- Acknowledgments -- Acronyms -- 1 Introduction -- 1.1 OPTICAL LITHOGRAPHY -- 1.1.1 Optical Lithography and Integrated Circuits -- 1.1.2 Brief History of Optical Lithography Systems -- 1.2 RAYLEIGH'S RESOLUTION -- 1.3 RESIST PROCESSES AND CHARACTERISTICS -- 1.4 TECHNIQUES IN COMPUTATIONAL LITHOGRAPHY -- 1.4.1 Optical Proximity Correction -- 1.4.2 Phase-Shifting Masks -- 1.4.3 Off-Axis Illumination -- 1.4.4 Second-Generation RETs -- 1.5 OUTLINE -- 2 Optical Lithography Systems -- 2.1 PARTIALLY COHERENT IMAGING SYSTEMS -- 2.1.1 Abbe's Model -- 2.1.2 Hopkins Diffraction Model -- 2.1.3 Coherent and Incoherent Imaging Systems -- 2.2

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Sommario/riassunto

A Unified Summary of the Models and Optimization Methods Used in Computational Lithography Optical lithography is one of the most challenging areas of current integrated circuit manufacturing technology. The semiconductor industry is relying more on resolution enhancement techniques (RETs), since their implementation does not require significant changes in fabrication infrastructure. Computational Lithography is the first book to address the computational optimization of RETs in optical lithography, providing an in-depth discussion of optimal optical proximity correction (OPC), phase shifting mask (PSM), and off-axis illumination (OAI) RET tools that use model-based mathematical optimization approaches. The book starts with an introduction to optical lithography systems, electric magnetic field principles, and the fundamentals of optimization from a mathematical point of view. It goes on to describe in detail different types of optimization algorithms to implement RETs. Most of the algorithms developed are based on the application of the OPC, PSM, and OAI approaches and their combinations. Algorithms for coherent illumination as well as partially coherent illumination systems are described, and numerous simulations are offered to illustrate the effectiveness of the algorithms. In addition, mathematical derivations of all optimization frameworks are presented. The accompanying MATLAB® software files for all the RET methods described in the book make it easy for readers to run and investigate the codes in order to understand and apply the optimization algorithms, as well as to design a set of optimal lithography masks. The codes may also be used by readers for their research and development activities in their academic or industrial organizations. An accompanying MATLAB® software guide is also included. An accompanying MATLAB® software guide is included, and readers can download the software to use with the guide at ftp://ftp.wiley.com/public/sci_tech_med/computational_lithography . Tailored for both entry-level and experienced readers, Computational Lithography is meant for faculty, graduate students, and researchers, as well as scientists and engineers in industrial organizations whose research or career field is semiconductor IC fabrication, optical lithography, and RETs. Computational lithography draws from the rich theory of inverse problems, optics, optimization, and computational imaging; as such, the book is also directed to researchers ...