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Nota di contenuto	Contents; Preface; Acknowledgments; Chapter 1 Introduction; 1.1 The SLAM Problem and Its Applications; 1.1.1 Description of the SLAM Problem; 1.1.2 Applications of SLAM; 1.2 Summary of SLAM Approaches; 1.2.1 EKF/EIF based SLAM Approaches; 1.2.2 Other SLAM Approaches; 1.3 Key Properties of SLAM; 1.3.1 Observability; 1.3.2 EKF SLAM Convergence; 1.3.3 EKF SLAM Consistency; 1.4 Motivation; 1.5 Book Overview; Chapter 2 Sparse Information Filters in SLAM; 2.1 Information Matrix in the Full SLAM Formulation; 2.2 Information Matrix in the Conventional EIF SLAM Formulation 2.3 Meaning of Zero Off-diagonal Elements in Information Matrix 2.4 Conditions for Achieving Exact Sparseness; 2.5 Strategies for Achieving Exact Sparseness; 2.5.1 Decoupling Localization and Mapping; 2.5.2 Using Local Submaps; 2.5.3 Combining Decoupling and Submaps; 2.6 Important Practical Issues in EIF SLAM; 2.7 Summary; Chapter 3

Decoupling Localization and Mapping; 3.1 The D-SLAM Algorithm; 3.1.1 Extracting Map Information from Observations; 3.1.2 Key Idea of D-SLAM; 3.1.3 Mapping; 3.1.4 Localization; 3.2 Structure of the Information Matrix in D-SLAM
3.3 Efficient State and Covariance Recovery 3.3.1 Recovery Using the Preconditioned Conjugated Gradient (PCG) Method; 3.3.2 Recovery Using Complete Cholesky Factorization; 3.4 Implementation Issues; 3.4.1 Admissible Measurements; 3.4.2 Data Association; 3.5 Computer Simulations; 3.6 Experimental Evaluation; 3.6.1 Experiment in a Small Environment; 3.6.2 Experiment Using the Victoria Park Dataset; 3.7 Computational Complexity; 3.7.1 Storage; 3.7.2 Localization; 3.7.3 Mapping; 3.7.4 State and Covariance Recovery; 3.8 Consistency of D-SLAM; 3.9 Bibliographical Remarks; 3.10 Summary
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Sommario/riassunto

Simultaneous localization and mapping (SLAM) is a process where an autonomous vehicle builds a map of an unknown environment while concurrently generating an estimate for its location. This book is concerned with computationally efficient solutions to the large scale SLAM problems using exactly sparse Extended Information Filters (EIF). The invaluable book also provides a comprehensive theoretical analysis of the properties of the information matrix in EIF-based algorithms for SLAM. Three exactly sparse information filters for SLAM are described in detail, together with two efficient and exact methods for recovering the state vector and the covariance matrix. Proposed algorithms are extensively evaluated both in simulation and through experiments.
