

| | |
|-------------------------|---|
| 1. Record Nr. | UNINA9910815886303321 |
| Titolo | From problem toward solution : wireless sensor networks security // Zhen Jiang and Yi Pan, editors |
| Pubbl/distr/stampa | New York, : Nova Science Publishers, c2009 |
| ISBN | 1-61209-732-4 |
| Edizione | [1st ed.] |
| Descrizione fisica | 1 online resource (398 p.) |
| Collana | Distributed, cluster and grid computing |
| Altri autori (Persone) | JiangZhen PanYi <1960-> |
| Disciplina | 681/.25 |
| Soggetti | Sensor networks - Security measures Wireless LANs - Security measures Wireless metropolitan area networks - Security measures Ad hoc networks (Computer networks) - Security measures |
| 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 | Intro -- FROM PROBLEM TOWARD SOLUTION:WIRELESS SENSOR NETWORKSSECURITY -- Distributed, Cluster and Grid Computing -- FROM PROBLEM TOWARD SOLUTION:WIRELESS SENSOR NETWORKSSECURITY -- CONTENTS -- PREFACE -- PART 1.ATTACKS AND COUNTERMEASURES -- PRESERVING DATA AUTHENTICITY IN WIRELESSENSOR NETWORKS: ATTACKS ANDCOUNTERMEASURES -- Abstract -- 1. Introduction -- 2. Models and Approaches -- 2.1. System Model -- 2.2. Threat Model -- 2.3. Solution Approaches -- 3. Passive Approaches -- 3.1. Secure Report Generation -- 3.2. Filtering with Uniform Key Sharing -- 3.3. Filtering with Route-specific Key Sharing -- 3.3.1. Interleaved Hop-by-hop Authentication -- 3.3.2. Other Solutions with Route-specific Key Sharing -- 3.4. Filtering with Location-based Key Sharing -- 3.4.1. Location-Based Resilient Security -- 3.4.2. Location-aware End-to-End Data Security -- 4. Proactive Approaches -- 4.1. Group Re-keying -- 4.2. Packet Traceback -- 4.3. Correlation among Data Content -- 4.3.1. Correlation Analysis and Modified t-test -- 5. Conclusion -- References -- LOCATION TRACKING ATTACK IN AD HOCNETWORKS BASED ON TOPOLOGY INFORMATION -- Abstract -- 1. Introduction -- 2. RelatedWork -- 3. |

Localization Using Geometric Constraints -- 3.1. Constraint Solving Definitions -- 3.2. The Localization Algorithm -- 3.2.1. Phase 1-Deterministic Constraint Solving -- 3.2.2. Phase 2-Constraint Relaxation and Heuristic Improvements -- 3.3. Experimental Results -- 4. Localization Using DSR Protocol Information -- 4.1. Dynamic Source Routing -- 4.2. Scenario and Assumptions -- 4.3. Localization Approach -- 4.3.1. "Hop to Route Length Ratio" (HL) Heuristics -- 4.3.2. Derivation of Node Distribution along the Route from the HL Metric -- 4.3.3. Probability Based Position Estimation -- 4.4. Analysis -- 5. Conclusion -- Acknowledgement -- References.

PREVENTION OF DOS ATTACK IN SENSOR NETWORKS USING REPEATED GAME THEORY -- Abstract -- 1. Introduction -- 2. Related Work -- 3. Game Formulation of the Proposed Protocol -- 3.1. Equilibrium -- 3.2. Payoff and Reputation -- 3.3. Protocol Description -- 4. Performance Evaluation -- 4.1. Metrics -- 4.2. Implementation -- References --

IMPACT OF PACKET INJECTION MODEL ON MISBEHAVIOR DETECTION PERFORMANCE IN WIRELESS SENSOR NETWORKS -- Abstract -- 1. Introduction -- 1.1. Wireless Ad-Hoc Networks and the Concept of Misbehavior -- 1.2. Overview on Misbehavior in Wireless Ad-Hoc Networks -- 1.3. Intrusion Detection Systems - Detecting Misbehavior -- 1.4. Human Immune System - Inspiration for AIS -- 1.4.1. Adaptive Immune System -- 1.4.2. Innate Immune System -- 1.5. Translating Features of the HIS to AIS -- 2. Packet Injection Experiment - Problem Statement -- 2.1. Experimental Setup -- 2.2. Scenario Description -- 2.3. Network Topology -- 2.4. Node Misbehavior -- 2.5. Artificial Immune System - Details -- 3. Packet Injection Experiment - Results -- 4. AIS in Ad-Hoc Networks - Related Work -- 5. Conclusions and Future Work -- Acknowledgments -- References --

PART 2. SECURED ROUTING AND LOCALIZATION -- SECURITY AWARE ROUTING IN HIERARCHICAL OPTICAL SENSOR NETWORKS -- Abstract -- 1. Introduction -- 1.1. Motivation for Directional Optical Sensor Networks and Challenges -- 2. Related Work -- 3. Cluster-Based Directional Sensor Networks -- 3.1. Assumptions and Security Threat Model -- 4. The Security-Aware Base Station Circuit-Based Routing for Cluster-based DOSN -- 4.1. Secure Neighborhood Discovery Protocol -- 5. Security Analysis -- 5.1. Per Hop Authentication and Alteration of Routing Beacons -- 5.2. Broadcast Authentication and Spoofed Routing Beacons -- 5.3. Beacon Freshness -- 6. Conclusion -- References --

SECURE MULTI-PATH DATA DELIVERY IN SENSOR NETWORKS. Abstract -- 1. Introduction -- 2. System Models -- 2.1. Network Model -- 2.2. Attack Model -- 3. Node-disjoint Multi-path Encoding/Decoding -- 3.1. Multi-path Source Routing Encoding -- 3.2. Multi-path Data Encoding -- 3.3. Multi-path Data Decoding -- 3.4. Communication Overhead -- 4. Path Selection -- 4.1. $v(3)$ -node-disjoint Shortest Paths -- 4.2. Path Rating Algorithm -- 4.3. Path Selection Algorithm -- 5. Robustness Analysis -- 5.1. General Evaluation Formulas -- 5.2. Uniform Block Allocation and Uniform Success Probability Distribution -- 5.3. Evaluate Success Probability for Multi-path Routing -- 6. Conclusion -- Appendices -- A. Encoding of Reed-Solomon Codes -- B. Decoding of Reed-Solomon Codes -- C. Proof of (21) -- References --

SELOC: SECURE LOCALIZATION FOR WIRELESS SENSOR AND ACTOR NETWORK -- Abstract -- 1. Introduction -- 2. Related Work -- 3. Network Model -- 3.1. Attack Models -- 3.2. Features of Secure Localization -- 4. SeLoc Secure Scheme -- 4.1. Brief Review of SeLoc Scheme -- 4.2. SeLoc Scheme -- 4.3. Location Verification -- 5. Security Analysis -- 5.1. Robustness -- 5.2. Sensitivity of SeLoc Scheme -- 6. Conclusion -- References --

PART 3. CRYPTOGRAPHY AND ENCRYPTION -- SECURITY IN WIRELESS SENSOR

NETWORKS:A FORMAL APPROACH -- Abstract -- 1. Introduction -- 2. Model Checking for the Analysis of Security Protocols -- 3. Sensor Network Encryption Protocol: SNEP -- 4. Verification of SNEP -- 5. RelatedWork -- Security Network Protocols -- Simulators of Sensor Networks -- Analysis with Model Checking Techniques -- 6. Conclusion -- References -- C4W: AN ENERGY EFFICIENT PUBLIC KEYCRYPTOSYSTEM FOR LARGE-SCALE WIRELESSSENSOR NETWORKS -- Abstract -- 1. Introduction -- 1.1. Related Work -- 1.2. Contributions -- 2. Combined Public Key Scheme for Wireless Sensor Networks -- 2.1. Basic Scheme -- 2.2. Security-Enhanced Scheme (SES). 2.3. Protocol -- 3. Analysis -- 3.1. Security -- 3.2. Energy -- 4. Conclusion -- References -- ENERGY CONSUMPTION OF SECURITY ALGORITHMSIN WIRELESS SENSOR NODES -- Abstract -- 1. Introduction -- 2. Cryptographic Algorithms for WSN Nodes -- 2.1. New Method for Reorganization of Cryptographic Algorithms -- 2.2. Related Work -- 2.3. Verification of Results -- 3. Measurement of Energy Consumption for Security -- 3.1. Tradeoff between Security and Energy Consumption -- 3.2. Related Work -- 3.3. Measurement Techniques -- 3.4. Energy Consumption without Security -- 3.4.1. Measurements for CrossBow Nodes -- 3.4.2. Measurements for Ember Nodes -- 3.5. Energy Consumption for Security -- 3.5.1. Energy Consumption for Security in CrossBow Nodes -- 3.5.2. Energy Consumption for Security in Ember Nodes -- 3.5.3. Comparisons of CrossBow & Ember Nodes -- 4. Assessment of Life-Time Energy Consumption -- 4.1. Life Time Energy Consumption -- 4.2. Energy Measurements and Profile Analyzer -- 4.2.1. Operational Circuit -- 4.2.2. Measurement Record Program -- 4.2.3. E-Analyzer: Energy Profile Analyzer -- 4.3. Case Study: Security Algorithms in CrossBow MICA2 Nodes -- 5. Guidelines to Apply Security into WSN -- 6. Conclusions -- References -- PART 4.KEY PRE-DISTRIBUTION AND REVOCATION -- DETERMINISTIC AND RANDOMIZED KEYPRE-DISTRIBUTION SCHEMES FOR MOBILEAD-HOC NETWORKS: FOUNDATIONS ANDEXAMPLE CONSTRUCTIONS -- Abstract -- 1. Introduction -- 2. General Considerations for Key Management Schemes -- 3. Techniques -- 3.1. Random Graph Based -- 4. Set System Based -- 4.0.1. Constrained Intersection Matrices -- 4.0.2. The BBR Polynomials -- 5. RandomWalk Based -- 5.1. Approximating the Evolution of Stochastic Processes -- 5.2. Gradual Increase of the Bit-Correlation -- 5.3. The General k-place Elimination Protocol -- 5.4. Assessment of the Elimination Protocol. 6. Probabilistic Technique Based -- 7. Conclusions -- References -- ARPD: ASYNCHRONOUS RANDOM KEYPREDISTRIBUTION IN THE LEAP FRAMEWORKFOR WIRELESS SENSOR NETWORKS -- Abstract -- 1. Introduction -- 2. RelatedWork -- 2.1. Pairwise Key Establishment in LEAP -- 2.1.1. LEAP Security -- 2.2. Random Pairwise Key Predistribution -- 3. ARPD for Node Additions -- 4. Performance Analysis -- 4.1. Section Notation and Assumptions -- 4.2. Probability of Connectivity -- 4.2.1. Key Reuse -- 4.2.2. Choice of Reuse Factor -- 5. Security Analysis -- 5.1. A Security Threat Model for WSNs -- 5.2. Outside Attacks -- 5.3. Inside Attacks -- 6. Conclusions -- References -- SECURE k-CONNECTIVITY PROPERTIESOF WIRELESS SENSOR NETWORKS -- Abstract -- 1. Introduction -- 2. The Reference Model -- 3. k-Connectivity of Kryptographs -- 3.1. Survivor Function Pr {connectivity k} -- 3.2. Expected Connectivity -- 4. Simulation Results -- 5. RelatedWork -- 6. Conclusion -- References -- GATEWAY SUBSET DIFFERENCE REVOCATION -- Abstract -- 1. Introduction -- 2. Subset Difference Revocation -- 3. Gateway Subset Difference Revocation -- 4. Evaluation -- 4.1. Security -- 4.2. Memory -- 4.3. Processing Load -- 5. Related Work -- 6. Conclusion -- References --

PART 5. KEY EXCHANGE AND ACCESS CONTROL -- AUTHENTICATED KEY EXCHANGE WITH GROUP SUPPORT FOR WIRELESS SENSOR NETWORKS -- Abstract -- 1. Introduction -- 1.1. Node-Compromise Attacker Model -- 1.2. Secure Link Communication -- 1.2.1. Random Key Pre-distribution -- 1.2.2. Pairwise Key Pre-distribution -- 1.3. Seed-Based Pre-distribution -- 1.3.1. Selective Node Capture Attack -- 1.3.2. Hypercube Pre-distribution -- 2. Group Supported Key Exchange -- 2.1. Authenticated Key Exchange with Group Support -- 2.2. Probabilistic Authentication -- 2.2.1. Probabilistic Authentication with Majority Decision. 2.3. Evaluation of the Communication and Computation Overhead.
