

1. Record Nr.	UNINA9910818378703321
Autore	Dressler Falko
Titolo	Self-organization in sensor and actor networks // Falko Dressler
Pubbl/distr/stampa	Chichester, West Sussex, England ; ; Hoboken, N.J., : Wiley, c2008
ISBN	9786612123115 9781282123113 1282123114 9781613444962 1613444966 9780470724460 0470724463 9780470724453 0470724455
Edizione	[1st ed.]
Descrizione fisica	1 online resource (388 p.)
Collana	Wiley series in communications networking & distributed systems
Classificazione	ST 200 ZQ 3030
Disciplina	681/.2
Soggetti	Sensor networks Self-organizing systems Natural computation Computer networks - Management - Data processing
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	ContentsPrefaceI Self Organization1 Introduction to Self Organization1.1 Understanding self organization1.2 Application scenarios for self organization2 System Management and Control A Historical Overview2.1 System architecture2.2 Management and control2.2.1 Centralized control2.2.2 Distributed systems2.2.3 Self organizing systems3 Self Organization Context and Capabilities3.1 Complex systems3.2 Self organization and emergence3.3 Systems lacking self organization3.3.1 External control3.3.2 Blueprints and templates3.4 Self X capabilities3.5 Consequences of emergent properties3.6 Operating self organizing systems3.6.1 Asimov's Laws of Robotics3.6.2 Attractors3.7 Limitations of self organization4 Natural Self Organization4.1 Development of

understandings4.2 Examples in natural sciences4.2.1 Biology4.2.2
 Chemistry4.3 Differentiation self organization and bio inspired4.3.1
 Exploring bio inspired4.3.2 Bio inspired techniques4.3.3 Self
 organization vs. bio inspired5 Self Organization in Technical Systems5.
 1 General applicability5.1.1 Autonomous systems5.1.2 Multi robot
 systems5.1.3 Autonomic networking5.1.4 Mobile Ad Hoc Networks5.
 1.5 Sensor and Actor Networks5.2 Operating Sensor and Actor
 Networks6 Methods and Techniques6.1 Basic methods6.1.1 Positive
 and negative feedback6.1.2 Interactions among individuals and with
 the environment6.1.3 Probabilistic techniques6.2 Design paradigms for
 self organization6.2.1 Design process6.2.2 Discussion of the design
 paradigms6.3 Developing nature inspired self organizing systems6.4
 Modeling self organizing systems6.4.1 Overview to modeling
 techniques6.4.2 Differential equation models6.4.3 Monte Carlo
 simulations6.4.4 Choosing the right modeling technique7 Self
 Organization Further ReadingII Networking Aspects: Ad Hoc and Sensor
 Networks8 Mobile Ad Hoc and Sensor Networks8.1 Ad hoc networks8.
 1.1 Basic properties of ad hoc networks8.1.2 Mobile Ad Hoc Networks8.
 2 Wireless Sensor Networks8.2.1 Basic properties of sensor networks8.
 2.2 Composition of single sensor nodes8.2.3 Communication in sensor
 networks8.2.4 Energy aspects8.2.5 Coverage and deployment8.2.6
 Comparison between MANETs and WSNs8.2.7 Application examples8.3
 Challenges and research issues8.3.1 Required functionality and
 constraints8.3.2 Research objectives9 Self Organization in Sensor
 Networks 9.1 Properties and objectives9.2 Categorization in two
 dimensions9.2.1 Horizontal dimension9.2.2 Vertical dimension9.3
 Methods and application examples9.3.1 Mapping with primary self
 organization methods9.3.2 Global state9.3.3 Location information9.3.4
 Neighborhood information9.3.5 Local state9.3.6 Probabilistic
 techniques10 Medium Access Control10.1 Contention based
 protocols10.2 Sensor MAC10.2.1 Synchronized listen/sleep cycles10.
 2.2 Performance aspects10.2.3 Performance evaluation10.3 Power
 Control MAC protocol10.4 Conclusion11 Ad Hoc Routing11.1 Overview
 and categorization11.1.1 Address based routing vs. data centric
 forwarding11.1.2 Classification of ad hoc routi.

Sommario/riassunto

Self-Organization in Sensor and Actor Networks explores self-
 organization mechanisms and methodologies concerning the efficient
 coordination between intercommunicating autonomous systems. Self-
 organization is often referred to as the multitude of algorithms and
 methods that organise the global behaviour of a system based on
 inter-system communication. Studies of self-organization in natural
 systems first took off in the 1960s. In technology, such approaches
 have become a hot research topic over the last 4-5 years with emphasis
 upon management and control in communication networks, and
 especially in resource-constrained sensor and actor networks. In the
 area of ad hoc networks new solutions have been discovered that
 imitate the properties of self-organization. Some algorithms for on-
 demand communication and coordination, including data-centric
 networking, are well-known examples. Key features include: . Detailed
 treatment of self-organization, mobile sensor and actor networks,
 coordination between autonomous systems, and bio-inspired
 networking. . Overview of the basic methodologies for self-
 organization, a comparison to central and hierarchical control, and
 classification of algorithms and techniques in sensor and actor
 networks. . Explanation of medium access control, ad hoc routing,
 data-centric networking, synchronization, and task allocation issues. .
 Introduction to swarm intelligence, artificial immune system, molecular
 information exchange. . Numerous examples and application scenarios

to illustrate the theory. Self-Organization in Sensor and Actor Networks will prove essential reading for students of computer science and related fields; researchers working in the area of massively distributed systems, sensor networks, self-organization, and bio-inspired networking will also find this reference useful.
