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The CTR with Different Deployment Region and Node Distribution; 4.4 Irregular Radio Coverage Area; 5 The CTR for Connectivity: Mobile Networks; 5.1 The CTR in RWP Mobile Networks .; 5.2 The CTR with Bounded, Obstacle-free Mobility; 6 Other Characterizations of the CTR; 6.1 The CTR for k-connectivity; 6.2 The CTR for Connectivity with Bernoulli Nodes; 6.3 The Critical Coverage Range; III Topology Optimization Problems; 7 The Range Assignment Problem; 7.1 Problem Definition; 7.2 The RA Problem in One-dimensional Networks 7.3 The RA Problem in Two- and Three-dimensional Networks 7.4 The Symmetric Versions of the Problem; 7.4.1 The SRA problem in one-dimensional networks; 7.4.2 The SRA problem in two- and three-dimensional networks; 7.4.3 Approximation algorithms for WSRA; 7.5 The Energy Cost of the Optimal Range Assignment; 8 Energy-efficient Communication Topologies; 8.1 Energy-efficient Unicast; 8.2 Energy-efficient Broadcast; IV Distributed Topology Control; 9 Distributed Topology Control: Design Guidelines; 9.1 Ideal Features of a Topology Control Protocol; 9.2 The Quality of Information 9.3 Logical and Physical Node Degrees 10 Location-based Topology Control; 10.1 The R&M Protocol; 10.1.1 The power consumption model; 10.1.2 Relay region and enclosure graph; 10.1.3 Protocol description; 10.1.4 Discussion; 10.2 The LMST Protocol; 10.2.1 Protocol description; 10.2.2 Protocol analysis; 10.2.3 The FLSSk protocol; 11 Direction-based Topology Control; 11.1 The CBTC Protocol; 11.1.1 The basic CBTC protocol; 11.1.2 Dealing with asymmetric links; 11.1.3 Protocol analysis; 11.1.4 Removing energy-inefficient links; 11.1.5 Discussion; 11.1.6 CBTC variants; 11.2 The DistRNG Protocol 12 Neighbor-based Topology Control

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## Sommario/riassunto

Topology control is fundamental to solving scalability and capacity problems in large-scale wireless ad hoc and sensor networks. Forthcoming wireless multi-hop networks such as ad hoc and sensor networks will allow network nodes to control the communication topology by choosing their transmitting ranges. Briefly, topology control (TC) is the art of co-ordinating nodes' decisions regarding their transmitting ranges, to generate a network with the desired features. Building an optimized network topology helps surpass the prevalent scalability and capacity problems.

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