DESCRIPTION

A comprehensive treatment of cognitive radio networks and the specialized techniques used to improve wireless communications.

The human brain, as exemplified by cognitive radar, cognitive radio, and cognitive computing, inspires the field of Cognitive Dynamic Systems. In particular, cognitive radio is growing at an exponential rate. *Fundamentals of Cognitive Radio* details different aspects of the human brain and provides examples of how it can be mimicked by cognitive dynamic systems. The text offers a communication-theoretic background, including information on resource allocation in wireless networks and the concept of robustness.

The authors provide a thorough mathematical background with data on game theory, variational inequalities, and projected dynamic systems. They then delve more deeply into resource allocation in cognitive radio networks. The text investigates the dynamics of cognitive radio networks from the perspectives of information theory, optimization, and control theory. It also provides a vision for the new world of wireless communications by integration of cellular and cognitive radio networks. This groundbreaking book:

- Shows how wireless communication systems increasingly use cognition to enhance their networks
- Explores how cognitive radio networks can be viewed as spectrum supply chain networks
- Derives analytic models for two complementary regimes for spectrum sharing (open-access and market-driven) to study both equilibrium and disequilibrium behaviors of networks
• Studies cognitive heterogeneous networks with emphasis on economic provisioning for resource sharing

• Introduces a framework that addresses the issue of spectrum sharing across licensed and unlicensed bands aimed for Pareto optimality

Written for students of cognition, communication engineers, telecommunications professionals, and others, _Fundamentals of Cognitive Radio_ offers a new generation of ideas and provides a fresh way of thinking about cognitive techniques in order to improve radio networks.

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**ABOUT THE AUTHOR**

**PEYMAN SETOODEH** is a Professor at the School of Electrical and Computer Engineering at Shiraz University, Shiraz, Iran.

**SIMON HAYKIN** is a Distinguished University Professor at McMaster University, Hamilton, Ontario, Canada.

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