

Waveform Design For Active Sensing Systems A Computational Approach

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Waveform Design For Active Sensing

WAVEFORM DESIGN FOR ACTIVE SENSING SYSTEMS - A ...

WAVEFORM DESIGN FOR ACTIVE SENSING SYSTEMS - A COMPUTATIONAL APPROACH By Hao He August 2011 Chair: Jian Li Major: Electrical and Computer Engineering Active sensing applications such as radar, sonar and medical imaging, demand proper designs of the probing waveform A well-synthesized waveform can significantly

Waveform Design for Active Sensing Systems

Waveform Design for Active Sensing Systems A Computational Approach With a focus on developing computational algorithms for examining waveform design in diverse active sensing applications, this guide is ideal for researchers and practitioners in the field The three parts conveniently correspond to the three categories of

He, Hao, Jian Li, and Petre Stoica. Waveform Design for ...

Waveform Design for Active Sensing Systems - A Computational Approach New York, NY: Cambridge University Press, 2012, 312 pp \$11000 (Hardbound) With a focus on developing computational algorithms for examining waveform design in diverse active sensing applications, this guide is ideal for researchers and practitioners in the field

MMSE adaptive waveform design for active sensing with ...

Index Terms—Adaptive waveform design, minimum mean squared error, active sensing, MIMO, radar, Bayesian, particle filters, optimal design I
INTRODUCTION I N active sensing systems, the information we acquire about the targets can inform the design of future waveforms to be transmitted in order to maximise, in some sense, the

Deep Radar Waveform Design for Efficient Automotive Radar ...

[1] M Soltanalian et al "Joint design of the receive lter and transmit sequence for active sensing", IEEE Signal Processing Letters, vol 20, no 5, pp 423{426, May 2013

MMSE ADAPTIVE WAVEFORM DESIGN FOR A MIMO ACTIVE ...

the active sensing modality, known as cognitive radar , and various articles provide a good overview of this topic [1 3] More specically, Huleihel et al include a schematic diagram of an active sensing architecture that is generally applicable [4, Fig 1] This active sensing formulation is a good t for spatial waveform shaping using multiple

Spatio-Temporal Waveform Design in Active Sensing Systems ...

waveform design for active sensing applications For this purpose a multi-antennaradar is exploited The targets in the radar vision are naturally composed of multiple layers of different materials Therefore, the interaction of these layers with the incident wave

Joint Design of Transmit Waveforms for Object Tracking in ...

Keywords: multiple object tracking; waveform design for active sensing; spectrum sharing; pulse-Doppler radar; multiuser wireless communications; multiobjective optimization 1 Introduction A multimodal system can be used to provide significant performance improvements in tracking multiple objects by integrating information from asymmetric

2 IEEE JOURNAL OF SELECTED TOPICS IN SIGNAL ...

Adaptive Waveform Design for Agile Sensing and Communication W AVEFORM-agile sensing, the ability to adapt and di-versify the waveform at each time instant, is fast be-coming one of the most important methods by which systems can be dynamically adapted to their environment to achieve performance gains over non-adaptive systems Such adaptation can

DISSERTATION SIGNAL DESIGN FOR ACTIVE SENSING

SIGNAL DESIGN FOR ACTIVE SENSING Recent advances in hardware technology across the active sensing spectra, from RF to optical, enable the construction of sophisticated excitation patterns that can be varied across time, space, frequency, wavenumber, and polarization In ...

Locating the Few: Sparsity-Aware Waveform Design for ...

Locating the Few: Sparsity-Aware Waveform Design for Active Radar Heng Hu, Mojtaba Soltanalian, Member, IEEE, Petre Stoica, Fellow, IEEE, and Xiaohua Zhu, Member, IEEE Abstract—Owing to the inherent sparsity of the target scene, compressed sensing (CS) has been successfully employed in ...

Unitary Space-Time Waveform Scheduling for High-Resolution ...

In active sensing systems, the objective is to design a communication system to learn certain facts about a particular environment of interest Perhaps the most widely known example of active sensing is a radar, which is an abbreviation for 'radio detec-tion and ranging' The purpose of a radar system is the detect the presence, range,

Phase Diagram-Based Sensing with Adaptive Waveform ...

describes two new concepts for high speed active sensing systems On the emitter side, we propose a phase-space-based waveform design that

presents a unique shape in the phase space, which can be easily converted into a real signal We call it phase space lobe The instantaneous frequency (IF) law of the emitted signal is found inside the time

[William Roberts, Hao He, Jian Li, and Petre Stoica]

robust waveform synthesis and receive filter design play crucial roles in achievable performance for many active sensing applications, including radar, sonar, medical imaging, and communications (channel estimation and spread spectrum) A flexible receive filter design approach can be ...

MAXIMIZING DETECTION PERFORMANCE WITH WAVEFORM ...

The flexibility afforded by modern waveform generators allows implementation of active sensing systems that can select, and even design, their transmitted waveforms on-the-fly This work was partly supported under MURI Grant No AFOSR FA9550-05-1-0443 and by the DARPA Waveforms for Active Sensing Program under NRL grant N00173-06-1-G006

Performance Prediction of Constrained Waveform Design for ...

Waveform Design for Adaptive Radar BE ACCEPTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF Doctor of Philosophy in Engineering Brian D Rigling, PhD SWORD Signal Waveform's Optimal Under Restriction Design for Active Sensing TX Transmit UHF Ultra High Frequency WLOG Without Loss of Generality vi List of Symbols and

WAVEFORM-AGILE SENSING: OPPORTUNITIES AND ...

quantifying the relationship between waveform design and the context of what is already known) remains a central challenge in waveform scheduling 32 Waveform design Design of waveforms for active sensing, particularly for radar and sonar, is a longstanding area of active research For example, the desire to produce constant-power

WAVEFORM-AGILE SENSING: OPPORTUNITIES AND ...

quantifying the relationship between waveform design and the downstream information most important to acquire (in the context of what is already known) remains a central challenge in waveform scheduling 32 Waveform design Design of waveforms for active sensing, particularly for radar and sonar, is a longstanding area of active research

Radar and Communication Co-existence: an Overview

waveform(s) transmitted by the sensing systems and the code-book(s) employed by the communication systems These are jointly optimized so as to guarantee that both the communication and the radar performance are satisfactory Co-design allows taking into account in the transceiver design effects