Fmcw Sar Matlab Code

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This book brings together papers presented at the 4th International Conference on Communications, Signal Processing, and Systems, which provides a venue to disseminate the latest developments and to discuss the interactions and links between these multidisciplinary fields. Spanning topics ranging from Communications, Signal Processing and Systems, this book is aimed at undergraduate and graduate students in Electrical Engineering, Computer Science and Mathematics, researchers and engineers from academia and industry as well as government employees (such as NSF, DOD, DOE, etc).

??Holt,Rinchart and Winston 1983??????. -- ??: Modern digital and analog communication systems/B. P. Lathi

????:Antenna theory and design

A Low-power Radar Imaging SystemGregory Charvat

Build your knowledge of SAR/ISAR imaging with this comprehensive and insightful resource The newly revised Second Edition of Inverse Synthetic Aperture Radar Imaging with MATLAB Algorithms covers in greater detail the fundamental and advanced topics necessary for a complete understanding of inverse synthetic aperture radar (ISAR) imaging and its concepts. Distinguished author and academician, Caner Özdemir, describes the practical aspects of ISAR imaging and presents illustrative examples of the radar signal processing algorithms used for ISAR imaging. The topics in each chapter are supplemented with MATLAB codes to assist readers in better understanding each of the principles discussed within the book. This new edition incudes discussions of the most up-to-date topics to arise in the field of ISAR imaging and ISAR hardware design. The book provides a comprehensive analysis of advanced techniques like Fourier-based radar imaging algorithms, and motion compensation techniques along with radar fundamentals for readers new to the subject. The author covers a wide variety of topics, including: Radar fundamentals, including concepts like radar cross section, maximum detectable range, frequency modulated continuous wave, and doppler frequency and pulsed radar The theoretical and practical aspects of signal processing algorithms used in ISAR imaging The numeric implementation of all necessary algorithms in MATLAB ISAR hardware, emerging topics on SAR/ISAR focusing algorithms such as bistatic ISAR imaging, polarimetric ISAR imaging, and near-field ISAR imaging, Applications of SAR/ISAR imaging techniques to other radar imaging problems such as thru-the-wall radar imaging and ground-penetrating radar imaging Perfect for graduate students in the fields of electrical and electronics engineering, electromagnetism, imaging radar, and physics, Inverse Synthetic Aperture Radar Imaging With MATLAB Algorithms also belongs on the bookshelves of practicing researchers in the related areas looking for a useful resource to assist them in their day-to-day professional work.

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A near real-time radar-based imaging system is developed in this dissertation. This system uses the combination of a spatially diverse antenna array, a high sensitivity range-gated frequency-modulated continuous wave (FMCW) radar system, and an airborne synthetic aperture radar (SAR) imaging algorithm to produce near real-time high resolution imagery of what is behind a dielectric wall. This system is capable of detecting and providing accurate imagery of target scenes made up of objects as small as 6 inch tall metallic rods and cylinders behind a 4 inch thick dielectric slab. A study is conducted of through-dielectric slab imaging by the development of a 2D model of a dielectric slab and cylinder. The SAR imaging algorithm is developed and tested on this model for a variety of simulated imaging scenarios and the results are then used to develop an unusually high sensitivity range-gated FMCW radar architecture. An S-band rail SAR imaging system is developed using this architecture and used to image through two different dielectric slabs as well as free-space. All results are in agreement with the simulations. It is found that free-space target scenes could be imaged using low transmit power, as low as 5 picowatts. From this result it was decided to develop an X-band front end which mounts directly on to the S-band rail SAR so that objects as small as groups of pushpins and aircraft models in free-space could be imaged. These results are compared to previous X-band direct conversion FMCW rail SAR work. It was found that groups of pushpins and models could be imaged at transmit powers as low as 10 nanowatts. A spatially diverse S-band antenna array will be shown to be developed for use with the S-band radar; thereby providing the ability for near real-time SAR imaging of objects behind dielectric slabs with the same performance characteristics of the S-band rail SAR. The research presented in this dissertation will show that near real-time radar imaging through lossy-dielectric slabs is accomplished when using a highly sensitive radar system located at a stand-off range from the slab using a free-space SAR imaging algorithm.

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