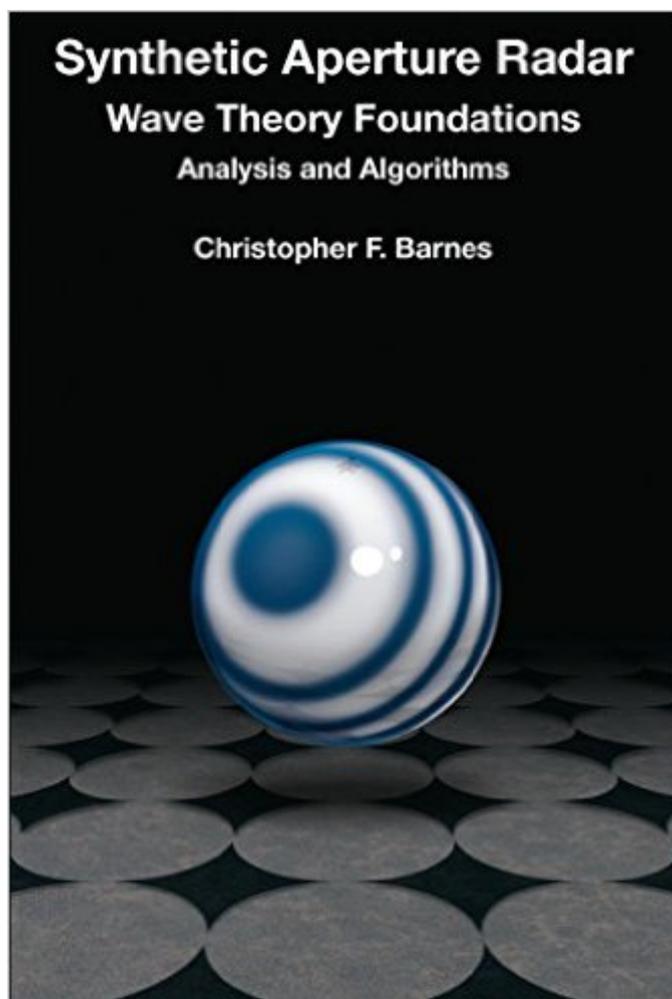# The book was found

Synthetic Aperture Radar

Synopsis

Synthetic Aperture Radar, Wave Theory Foundations, Analysis and Algorithms delivers a comprehensive and in-depth study of the subject. This book covers all major topics related to synthetic aperture radar (SAR) science, systems and software. SAR science is established on a foundation of wave theory. SAR systems for stripmap, spotlight, spotmap, volumetric, inverse, scan, swept, etc. modes are explained. SAR analysis techniques are presented at a detailed mathematical level, including analyses of chirp signals, and both stretch and chirp receiver systems. All SAR algorithm classes are presented: Stolt formatting, polar formatting (including direct and filtered back-projection methods), hyperbolic coherent summing, spherical coherent summing (including direct, filtered and factorized back-propagation versions), range stacking, range-Doppler and chirp scaling. Most SAR algorithms are described with sufficient detail to enable software implementations. Novel methods for volumetric SAR (VolSAR) imaging are presented. The empowerment of diffraction limited VolSAR imaging with swarms of SAR sensors and non-linear flight paths is demonstrated in simulation studies. Coherent fusion of multiband SAR is also demonstrated. Vector and scalar wave motion equations based on Maxwell's equations and acoustic wave dynamics are derived. Electromagnetic and acoustic wave theory principles are used to develop SAR signal models for both differential and integral descriptions of terrain scattering and received backscatter. SAR and computed imaging literature of the last sixty years is extensively surveyed and summarized. Relationships between SAR image formation algorithms and the computed imaging algorithms of holography, diffraction tomography, ray tomography and seismology are explained. Many variations of SAR algorithms that can be found in the literature are organized into a taxonomy that illuminates algorithm relationships. #SARWAVE

Book Information

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Customer Reviews

Another excellent book from what should be called: "The Georgia Tech School of Radar".This book by Prof. Barnes attempts to provide a holistic foundation of modern synthetic aperture radar theory that is different from the popular classical works. The classical works I am familiar with are: 1) Digital Processing of Synthetic Aperture Radar Data by Cumming and Wong. 2) Spotlight-Mode Synthetic Aperture Radar by Jackowatz et al. 3) Spotlight Synthetic Aperture Radar by Carrara and Majewski. 4) Synthetic Aperture Radar Signal Processing by Soumekh. 5) Synthetic Aperture Radar: Systems and Signal Processing by Curlander et al. Although these books have their strengths, what they lack is fundamental pedagogy in relating basic and advanced signal processing principles to basic and fundamental physics. I shall refer to these books as "legacy books".What strikingly distinguishes this book from the legacy books is that Barnes has harmoniously synthesized electromagnetic scattering theory and SAR signal processing in a unified framework. Without such a framework, one feels a definite confusion and lack of depth/intuition going through the legacy SAR books. The author in page 12 correctly alludes to the "Balkanization of the practicing SAR communities". Anyone going through even a modest number of the 1000+! references (side note: I do not think there exists too many people reading 1000+ references related to SAR theory) cited by the author notices that many papers and books are based upon a simplified geometric viewpoint that lead to basic equations based upon time-varying range. Subsequently, Taylor series approximations are used to derive basic design parameters of a SAR system.

Synthetic Aperture Radar Synthetic Aperture Radar: Systems and Signal Processing Digital Processing of Synthetic Aperture Radar Data: Algorithms and Implementation [With CDROM] (Artech House Remote Sensing Library) Inverse Synthetic Aperture Radar Imaging With MATLAB Algorithms Spotlight Synthetic Aperture Radar: Signal Processing Algorithms (Artech House Remote Sensing Library) Radar Equations for Modern Radar (Artech House Radar) Multiple-Target Tracking with Radar Applications (Artech House Radar Library) (Artech House Radar Library (Hardcover)) Stimson's Introduction to Airborne Radar (Electromagnetics and Radar) Police Radar Basics: Everything Every Driver, and the Police, should know about Traffic Speed Radar Introduction to Radar Target Recognition (Radar, Sonar & Navigation) Angle of Arrival Estimation

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