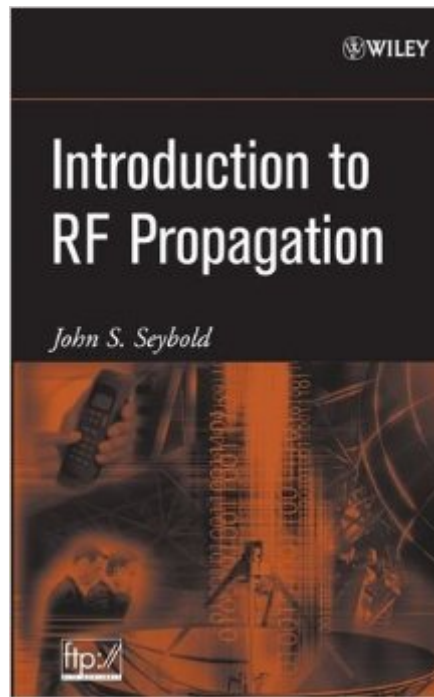


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# Introduction To RF Propagation



## Synopsis

An introduction to RF propagation that spans all wireless applications. This book provides readers with a solid understanding of the concepts involved in the propagation of electromagnetic waves and of the commonly used modeling techniques. While many books cover RF propagation, most are geared to cellular telephone systems and, therefore, are limited in scope. This title is comprehensive—it treats the growing number of wireless applications that range well beyond the mobile telecommunications industry, including radar and satellite communications. The author's straightforward, clear style makes it easy for readers to gain the necessary background in electromagnetics, communication theory, and probability, so they can advance to propagation models for near-earth, indoor, and earth-space propagation. Critical topics that readers would otherwise have to search a number of resources to find are included: \* RF safety chapter provides a concise presentation of FCC recommendations, including application examples, and prepares readers to work with real-world propagating systems \* Antenna chapter provides an introduction to a wide variety of antennas and techniques for antenna analysis, including a detailed treatment of antenna polarization and axial ratio; the chapter contains a set of curves that permit readers to estimate polarization loss due to axial ratio mismatch between transmitting and receiving antennas without performing detailed calculations \* Atmospheric effects chapter provides curves of typical atmospheric loss, so that expected loss can be determined easily \* Rain attenuation chapter features a summary of how to apply the ITU and Crane rain models \* Satellite communication chapter provides the details of earth-space propagation analysis including rain attenuation, atmospheric absorption, path length determination and noise temperature determination. Examples of widely used models provide all the details and information needed to allow readers to apply the models with confidence. References, provided throughout the book, enable readers to explore particular topics in greater depth. Additionally, an accompanying Wiley ftp site provides supporting MathCad files for select figures in the book. With its emphasis on fundamentals, detailed examples, and comprehensive coverage of models and applications, this is an excellent text for upper-level undergraduate or graduate students, or for the practicing engineer who needs to develop an understanding of propagation phenomena.

## Book Information

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## Customer Reviews

This book does not get into details of the math and physics. To do so, it would be volumes. But the book provides a very effective overview of the topic and the references are very relevant to the topic so that the reader can deeper into the topics by pursuing those references. The book can give the reader an overall understanding of RF and is an easy to read book. It can be read over a weekend.

I am an EE but have been out of school for 35 years. This book was needed to bring me back up to speed on RF effects on low band VHF propagation. It is well written and the math is well explained. This allowed me to understand the text and the math and apply it to my problem. Well worth the cost.

While I will agree that the text has some errors, the concepts presented by this book are rock solid and easy to understand. As someone new to RF engineering, this book has been very helpful in describing the basic concepts of antennas, link budgets, atmospheric attenuation, and propagation models. If you're looking for hardcore mathematics, this book is not for you. If you're looking for a practical conceptual understanding of RF, pick it up. It's very easy to read. Although I like the book, I give it four stars due to the lack of an "answers" (not solutions) appendix. I think all math/physics/engineering books should have an answers section so that we can all stop worrying about our solutions... Anyway, its a good book.

My rating is insignificant. I have not yet read the book. Just wanted to share an error with you. P. 14, Section 2.2 "The Electric Field". The equation is wrong. It is written as:  $E = eD$  It should be:  $D = eE$  where  $D$  is the electric flux density vector (coulomb / m<sup>2</sup>)  $e$  (epsilon) is the permittivity of the

medium (farads/meter)  $E$  is the electric field vector (newtons per coulomb (N/C) or volts per meter (V/m) ) Also, on P. 15, TABLE 2.1 the equations for the Electric Field intensity are incorrect. Their units are wrong... Electric Field units are newtons per coulomb (N/C) or volts per meter (V/m). For the Infinite line charge:  $E = (\text{linear charge density } (\lambda)) / (2\pi r \epsilon) * \hat{r}$  ( $\epsilon = \text{epsilon}$ ) For the Infinite surface charge:  $E = (\text{surface charge density } (\sigma)) / (2\epsilon) * \hat{r}$  ( $\epsilon = \text{epsilon}$ ) Note:  $\lambda$  has units of coulombs/meter ,  $\sigma$  has units of coulombs / m<sup>2</sup>

I'm just using this book as a reference and wanted to highlight an error. Just ignore the rating because I haven't read the whole book thoroughly, but I'm forced to give a rating. Page 196, first paragraph: "If the signal bandwidth is less than the coherence bandwidth,  $B < B_c$ , then the channel is considered wideband or flat (flat fading). Otherwise, it is called a narrowband channel (selective fading)." The terms wideband and narrowband seems to have been switched. Narrowband channels are flat fading, while wideband channels are frequency selective fading.

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