



# The Foundations of Signal Integrity

By Paul G. Huray

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**The Foundations of Signal Integrity** By Paul G. Huray

**The first book to focus on the electromagnetic basis of signal integrity**

*The Foundations of Signal Integrity* is the first of its kind—a reference that examines the physical foundation of system integrity based on electromagnetic theory derived from *Maxwell's Equations*. Drawing upon the cutting-edge research of Professor Paul Huray's team of industrial engineers and graduate students, it develops the physical theory of wave propagation using methods of solid state and high-energy physics, mathematics, chemistry, and electrical engineering before addressing its application to modern high-speed systems. Coverage includes:

- All the necessary electromagnetic theory needed for a complete understanding of signal integrity
- Techniques for obtaining analytic solutions to Maxwell's Equations for ideal materials and boundary conditions
- Plane electromagnetic waves
- Plane waves in compound media
- Transmission lines and waveguides
- Ideal models vs. real-world systems
- Complex permittivity of propagating media
- Surface roughness
- Advanced signal integrity
- Signal integrity simulations
- Problem sets for each chapter

With its thorough coverage of this relatively new discipline, the book serves as an ideal textbook for senior undergraduate and junior graduate students, as well as a resource for practicing engineers in this burgeoning field. At the end of each section, it typically stimulates the reader with open-ended questions that might lead to future theses or dissertation research.

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## Editorial Review

### Review

"Techniques that show how to obtain analytic solutions for ideal materials and boundary conditions are presented. These solutions are then used as a benchmark to solve real world problems via computational techniques. The book is written in the language of an electrical engineer." (*Zentralblatt MATH*, 2010)

### About the Author

**Paul G. Huray**, PhD, is Professor of Electrical Engineering at the University of South Carolina, where he has taught signal integrity, mathematical physics, and computer communications. Professor Huray introduced the first electromagnetics course to focus on signal integrity, and that program has produced more than eighty practicing signal integrity engineers now employed in academia, industry, and government. He earned his PhD in physics at the University of Tennessee in 1968, conducted research in the Solid State, Chemistry, and Physics Divisions at the Oak Ridge National Laboratory, and has worked part time for the Intel Corporation in developing the physical basis for barriers to circuits with bit rates up to 100 GHz.

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