



hand-held graphics calculator is one such form of technology that has been integrated into the book. Topics in algebra, trigonometry, and analytical geometry appear in the Appendix. This book integrates analytical and digital solutions through Alternative Transients Program (ATP) software, recognized for its use all over the world in academia and in the electric power industry, utilizing a didactic approach appropriate for graduate students and industry professionals alike. This book presents an approach to solving singular-function differential equations representing the transient and steady-state dynamics of a circuit in a structured manner, and without the need for physical reasoning to set initial conditions to zero plus (0+). It also provides, for each problem presented, the exact analytical solution as well as the corresponding digital solution through a computer program based on the Electromagnetics Transients Program (EMTP). Of interest to undergraduate and graduate students, as well as industry practitioners, this book fills the gap between classic works in the field of electrical circuits and more advanced works in the field of transients in electrical power systems, facilitating a full understanding of digital and analytical modeling and solution of transients in basic circuits.

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Understanding tensors is essential for any physics student dealing with phenomena where causes and effects have different directions. A horizontal electric field producing vertical polarization in dielectrics; an unbalanced car wheel wobbling in the vertical plane while spinning about a horizontal axis; an electrostatic field on Earth observed to be a magnetic field by orbiting astronauts—these are some situations where physicists employ tensors. But the true beauty of tensors lies in this fact: When coordinates are transformed from one system to another, tensors change according to the same rules as the coordinates. Tensors, therefore, allow for the convenience of coordinates while also transcending them. This makes tensors the gold standard for expressing physical relationships in physics and geometry. Undergraduate physics majors are typically introduced to tensors in special-case applications. For example, in a classical mechanics course, they meet the "inertia tensor," and in electricity and magnetism, they encounter the "polarization tensor." However, this piecemeal approach can set students up for misconceptions when they have to learn about tensors in more advanced physics and mathematics studies (e.g., while enrolled in a graduate-level general relativity course or when studying non-Euclidean geometries in a higher mathematics class). Dwight E. Neuenschwander's Tensor Calculus for Physics is a bottom-up approach that emphasizes motivations before providing definitions. Using a clear, step-by-step approach, the book strives to embed the logic of tensors in contexts that demonstrate why that logic is worth pursuing. It is an ideal companion for courses such as mathematical methods of physics, classical mechanics, electricity and magnetism, and relativity.

An accessible introduction to the fundamentals of calculus needed to solve current problems in engineering and the physical sciences I ntegration is an important function of calculus, and Introduction to Integral Calculus combines fundamental concepts with scientific problems to develop intuition and skills for solving mathematical problems related to engineering and the physical sciences. The authors provide a solid introduction to integral calculus and feature applications of integration, solutions of differential equations, and evaluation methods. With logical organization coupled with

