

1. Record Nr.	UNINA9910337647603321
Autore	Nahin Paul J.
Titolo	Transients for Electrical Engineers : Elementary Switched-Circuit Analysis in the Time and Laplace Transform Domains (with a touch of MATLAB®) // by Paul J. Nahin
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2019
ISBN	3-319-77598-7
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (XXVI, 189 p. 70 illus., 1 illus. in color.)
Disciplina	621.31921
Soggetti	Power electronics Electronic circuits Applied mathematics Engineering mathematics Power Electronics, Electrical Machines and Networks Circuits and Systems Mathematical and Computational Engineering Electronic Circuits and Devices
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Foreword -- Preface -- Acknowledgments.-About the Author -- 1 Basic Circuit Concepts -- 2 Transients in the Time Domain -- 3 The Laplace Transform -- 4 Transients in the Transform Domain -- 5 Transmission Lines -- 6 Transients in Transmission Lines -- Appendix 1: Euler's identity -- Appendix 2: Heaviside's Distortionless Transmission Line Condition -- Appendix 3 How to Solve for the Step Response of the Atlantic Cable Diffusion Equation Without the Laplace Transform -- Appendix 4 A Short Table of Laplace Transforms and Theorems -- Index.
Sommario/riassunto	This book offers a concise introduction to the analysis of electrical transients aimed at students who have completed introductory circuits and freshman calculus courses. While it is written under the assumption that these students are encountering transient electrical circuits for the first time, the mathematical and physical theory is not

'watered-down.' That is, the analysis of both lumped and continuous (transmission line) parameter circuits is performed with the use of differential equations (both ordinary and partial) in the time domain, and the Laplace transform. The transform is fully developed in the book for readers who are not assumed to have seen it before. The use of singular time functions (unit step and impulse) is addressed and illustrated through detailed examples. The appearance of paradoxical circuit situations, often ignored in many textbooks (because they are, perhaps, considered 'difficult' to explain) is fully embraced as an opportunity to challenge students. In addition, historical commentary is included throughout the book, to combat the misconception that the material in engineering textbooks was found engraved on Biblical stones, rather than painstakingly discovered by people of genius who often went down many wrong paths before finding the right one. MATLAB® is used throughout the book, with simple codes to quickly and easily generate transient response curves.
