

1. Record Nr.	UNINA9911114517103321
Autore	Smolkin Eugen
Titolo	Nonlinear Waves in a Goubau Line : Mathematical Analysis and Numerical Modeling / / by Eugen Smolkin
Pubbl/distr/stampa	Singapore : , : Springer Nature Singapore : , : Imprint : Springer, , 2026
ISBN	981-9560-01-2 9789819560011
Edizione	[1st ed. 2026.]
Descrizione fisica	1 online resource (353 pages)
Collana	Springer Series in Optical Sciences, , 1556-1534 ; ; 78
Disciplina	535.32 535.13
Soggetti	Geometrical optics Wave theory of light Electrodynamics Mathematical physics Classical Optics, Geometric and Wave optics Classical Electrodynamics Mathematical Methods in Physics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Preface -- Introduction -- Linear waves -- Nonlinear te waves.- Nonlinear tm waves -- Nonlinear coupled waves -- Nonlinear hybrid waves -- Bibliography.
Sommario/riassunto	This book offers a rigorous and comprehensive study of nonlinear electromagnetic wave propagation in the cylindrical Goubau line with inhomogeneous and Kerr-type nonlinear media. It systematically develops mathematical models that describe the propagation of transverse electric (TE), transverse magnetic (TM), and coupled TE–TM waves in the Goubau line configuration, where the dielectric permittivity depends on both the field intensity and the radial coordinate. Key concepts explored here include nonlinear eigenvalue boundary-value problems, integral equations, and fixed-point techniques. The chapters cover topics such as nonlinear TE and TM modes, coupled TE–TM wave behaviors, and Goubau line configurations (including multilayer

dielectric coatings). The author presents an expert analysis of these complex phenomena through a blend of analytical methods and numerical techniques, ensuring both mathematical rigor and physical insight. Theoretical results are supported by existence and uniqueness theorems, spectral analysis, and asymptotic estimates, while numerical approaches validate the analytical framework. This monograph is intended for applied mathematicians, physicists, and engineers working in nonlinear electrodynamics, waveguide theory, and numerical modeling. It serves as both a research monograph and a reference text, with each chapter designed to be largely self-contained for flexible use by the reader. Researchers and students will find this book an invaluable resource for extending their analytical and computational tools in nonlinear wave propagation.
