1. Record Nr. UNINA9911064748103321

Autore	Xin Xiangjun
Titolo	Advanced Optical Fiber Transmission Systems / / by Xiangjun Xin
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2026
ISBN	3-032-09516-6
Edizione	[1st ed. 2026.]
Descrizione fisica	1 online resource (286 pages)
Collana	Wireless Networks, , 2366-1445
Disciplina	004.6
Soggetti	Computer networks Computer engineering Wireless communication systems Mobile communication systems Computer Communication Networks Computer Engineering and Networks Wireless and Mobile Communication
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Chapter 1 Introduction -- Chapter 2 Advanced Coding Technology -- Chapter 3 Advanced Modulation Technology -- Chapter 4 Raman Amplifier -- Chapter 5 Advanced Modulation Format Recognition technology -- Chapter 6 Advanced Equalization technology -- Chapter 7 Nonlinear Compensation Technology Based on Artificial Intelligence.
Sommario/riassunto	This book delves deeply into the key technologies and cutting-edge advancements of advanced optical fiber transmission systems. It focuses on the innovative methods and practical applications in core areas such as coding, modulation, amplification, equalization, and nonlinear compensation of optical fiber communication systems against the backdrop of high-speed and high-capacity communication demands. The book also systematically presents a comprehensive overview of optical fiber communication from fundamental theories to the latest technological developments, with particular emphasis on breakthroughs in high-order modulation, multi-dimensional signal processing, and artificial intelligence-assisted technologies. Chapter 1, readers learn the historical background of optical fiber communication, its system architecture, and its core position in modern communication

networks. Chapter 2 delves into advanced coding techniques, including probabilistic shaping, LDPC coding, and adaptive RS coding, which enhance system reliability and spectral efficiency. Chapter 3 focuses on advanced modulation techniques such as symbol slicing and multiplexing, Delta-Sigma modulation, and 4D ultra-high-order modulation, significantly increasing transmission capacity and system performance. Chapter 4 specifically introduces the basic principles of Raman amplifiers, pump configurations, and their crucial role in long-distance transmission. Chapter 5 covers modulation format recognition and OSNR monitoring technologies, combined with machine learning methods to achieve intelligent signal processing. Chapter 6 discusses advanced equalization techniques, including phase estimation based on principal component analysis and nonlinear compensation algorithms. Chapter 7 explores nonlinear compensation methods based on artificial intelligence, such as weighted K-means clustering and Gaussian mixture models, laying the foundation for the next generation of intelligent optical networks. This book is suitable for researchers, engineers, senior undergraduates, and postgraduates in the field of optical communication. It aims to provide readers with a comprehensive technical perspective from the basics to the cutting-edge, promoting the continuous development of optical fiber communication technology in terms of capacity, distance, and intelligence.