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Sommario/riassunto	This book compiles cutting-edge research from the 2025 International Conference on Mechanical Transmission (ICMT 2025), systematically exploring theoretical breakthroughs and industrial innovations in mechanical transmission. The content spans new transmission theories and modeling methods (e.g., digital twin-driven lifecycle design), smart materials (composites/polymers), green manufacturing technologies, and AI-integrated optimization strategies for transmission systems. The book focuses on addressing core challenges such as fatigue reliability, NVH (Noise, Vibration, and Harshness) behavior, and energy efficiency improvement, while showcasing industrial applications of smart gears and bearings, predictive maintenance algorithms, and sustainable lubrication technologies. The content uniquely integrates a "precision-green-intelligent" manufacturing paradigm, offering interdisciplinary solutions. For example, it demonstrates closed-loop optimization of transmission systems from design to testing via digital

twin technology and enhances the reliability of industrial robots and wind turbines through AI-driven fault diagnosis. Bridging academia and industry, this book supports the development of efficient, low-noise, and low-carbon next-generation transmission systems for aerospace, new energy vehicles, marine equipment, and beyond.
