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The first book of its kind, *Theory of Gearing: Kinematics, Geometry, and Synthesis* systematically develops a scientific theory of gearing that makes it possible to synthesize novel gears with the desired performance. Written by a leading gearing expert who holds more than 200 patents, it presents a modern methodology for gear design.

The proposed theory is based on a key postulate: all the design parameters for an optimal gear pair for a particular application can be derived from (a) a given configuration of the rotation vectors of the driving and driven shafts and (b) the power transmitted by the gear pair. This allows engineers to synthesize the desired gear pairs with only the following input information:

The rotation and torque on the driving shaft

The configuration of the driven shaft in relation to the driving shaft

The desired rotation and torque of the driven shaft

Beginning with the fundamentals, the book reconsiders the basic theory of kinematics and geometry of gears to provide a sound basis for the evaluation and development of future designs. It then examines ideal and real gearing for parallel-axis, intersected-axis, and crossed-axis gearing. The book addresses how to minimize vibration and noise in gears, discusses aspects of implementing the theory of gearing, and analyzes principal features of power transmission and the loading of gear teeth. More than 500 figures clearly illustrate the principles.

This is an invaluable resource for engineers and researchers who work in gear design, gear production, and the application of gears as well as for students in mechanical and manufacturing engineering. Covering all known gear designs, this book offers an analytical solution to the problem of designing optimal gear pairs for any given application. It also encourages researchers to further develop the theory of gearing.