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Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	High-speed PM machines: applications, trends and limits -- Electromagnetic modeling of slotless PM machines -- Structural aspects of PM rotors -- Rotordynamic aspects of high-speed electrical machines -- Bearings for high-speed machines -- Design of the high-speed-spindle motor -- Control of the synchronous PM motor -- Experimental results.
Sommario/riassunto	There is a growing number of applications that require fast-rotating machines; motivation for this thesis comes from a project in which downsized spindles for micro-machining have been researched. The thesis focuses on analysis and design of high-speed PM machines and uses a practical design of a high-speed spindle drive as a test case. Phenomena, both mechanical and electromagnetic, that take precedence in high-speed permanent magnet machines are identified and systematized. The thesis identifies inherent speed limits of permanent magnet machines and correlates those limits with the basic parameters of the machines. The analytical expression of the limiting quantities does not only impose solid constraints on the machine design, but also creates the way for design optimization leading to the maximum mechanical and/or electromagnetic utilization of the machine. The models and electric-drive concepts developed in the thesis are evaluated in a practical setup.